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DR MIX (October 11, 1917) The patient, a male twenty-three years old, single, entered the hospital complaining of stomach trouble

Previous Illness—Measles at the age of four appendectomy at the age of sixteen There have been no other illnesses

Family History—His father and mother are living and well He has a brother who weighs about 40 pounds more than he He has two sisters who are living and well and both are heavier than the patient

Venereal History—Absolutely negative

Present Illness—His present trouble began about three and a half years ago with slight eructations of food—about two mouthfuls came up every morning following his breakfast This continued for about six months after which time he began to be troubled with a burning sensation in the epigastrium, which came on fifteen minutes after eating and lasted a variable length of

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time sometimes only fifteen minutes and sometimes an hour He does not remember the early history of his symptoms with any degree of clearness He does remember however that the burning was not accompanied by nausea or vomiting although there was regurgitation.

This burning sensation lasted for about one and a half years at the end of which time he went to a Texas city where a diagnosis of gastric ulcer was made and where he was treated for a time. At first he was given no food whatever and subsequently he was given only milk. He remained in the hospital undergoing this treatment for a period of about six weeks. At the end of that time feeling no better and being somewhat discouraged he returned to his home unimproved He remained in his home for a year without any treatment feeling miserable most of the time and being quite incapable of working By reason of the fact that he was not improved when treated in the hospital in Texas he began to doubt very much the diagnosis of gastric ulcer

His present difficulty consists chiefly of a heavy distress in the epigastrium somewhat painful though more distressing than actually painful The distress and pain do not radiate into the thorax They are made worse by the ingestion of food and are not relieved by anything except bicarbonate of soda and oxid of magnesia At the present time he also complains of nausea though he does not vomit and of eructations of sour and acrid stomach contents He feels very weak and says that during the last two years he has lost about 20 pounds in weight At the present time he weighs under 120 pounds

Examination.—The main point in the patient's early history is the operation of appendectomy six years ago when he was sixteen years of age Cross-examination of the patient as to his symptoms at that time rather substantiates the diagnosis of appendicitis although he states that when the appendix was removed it was not very much diseased Nevertheless the removal of the appendix was followed by perfect health for a period of two and a half years. During this period his stomach never gave him a moment of concern

About three and a half years ago he began having trouble with his stomach The early history of his complaints is rather hazy in his mind, the thing that is best remembered being the eructation of two mouthfuls of food each morning after his breakfast He does not recall that at the beginning of his trouble he had very much pain In the course of time however, pain developed and it came rather promptly after eating, from fifteen minutes to one and a half hours after meals Further cross examination discloses the fact that at first the location of this pain was for the most part in the epigastrium, second that the pain did not radiate into the thorax, third, that the time of its occurrence was within a short time after eating fourth that food made the pain worse rather than better, fifth that the pain was a steady burning pain, and not rhythmic, wave like or colicky in character

He also complains of gas and belching These symptoms are common to all abdominal diseases associated with hyperacidity, whether the disease be ulcer of the stomach or duodenum biliary tract infections adhesions gastroptosis with hyperacidity or appendicitis with hyperacidity In all of these conditions the effect of the hyperacidity upon the patient is to induce that patient to believe that there is gas in the stomach In order to get rid of the fictitious gas which is really nothing but the sensation caused by the irritation of excessive acid the patient makes numerous endeavors to belch and in the course of time may swallow sufficient air to make it possible to get a little back We know positively however that these belchers do not have great masses of gas in the stomach that in every single instance, when they are given barium and buttermilk and a fluoroscopic examination is made there is found only a small bubble of gas in the fundus of the stomach the so-called Magenblase We therefore may at once dismiss these two symptoms of gas and belching complained of by this patient as having absolutely no diagnostic value other than indicating the probable presence of excessive secretion of acid

Another extremely important point in this patient's history is the matter of regurgitation and vomiting It is our experience

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that patients with ulcers of the duodenum not associated with complications do not vomit This patient had regurgitation of food and nausea although he did not actually vomit. This is indicative of the presence of gastric rather than duodenal ulcer In those cases in which ulcer of the duodenum and vomiting are associated we find something besides the duodenal ulcer at fault It is either a perduodenitis an attempt at perforation an inflammation of the peritoneum or an infected gall bladder or a complicating ulcer that is responsible for such regurgitation nausea or vomiting In the cases where gastric ulcer is the complicating factor food contents alone are usually vomited If on the other hand the biliary tract is at fault or there is some inflammation of the peritoneum then there is a tendency toward the vomiting of bile In the case of this patient only stomach contents were regurgitated This raises the presumption strongly in favor of a gastric ulcer

Associated with pain in the epigastrium in his case is the location of tenderness in the epigastrium. This tenderness is not absolutely sharply localized as it is in the ordinary case of gastric ulcer Neither is it located as far to the right as it usually is in the presence of a duodenal ulcer In the case of this patient the epigastric tenderness can be accepted merely as a fact without our being able to say that it points either toward a gastric or duodenal ulcer exclusively On the whole it is more indicative

persist [illegible]

Such constipation raises the presumption of the presence of gastric or duodenal ulcer as against the presence of a biliary tract infection Patients with gall stone disease are as a rule not troubled with constipation Patients with gastric or duodenal ulcer are almost invariably so afflicted.

Very important in the history of this patient's case are certain negative facts. Throughout the three and a half years there has been no evidence of any infection He has never had fever headaches or inflammations or infections of any of his joints

His tongue has not been coated He has had no so-called bilious spells In other words there is no evidence that this patient s abdominal disease is a focal infection in the sense that it is a focus of d stribution of septic material or of toxemia When a patient has an infected gall bladder he has a center for the distribution of infective material When a patient has an ulcer of the stomach or of the duodenum his ulcer is not a focus for septic distribution In this respect the symptomatology of biliary tract infections on the one hand and of ulcer cases on the other hand is very sharply contrasted Both biliary tract infections and ulcers are the results of infection but biliary tract infections are not merely foci of the reception of the infection they become also foci of distribution Gastric and duodenal ulcers are merely the end products of infection They never become foci of distribution Consequently an ulcer of the stomach and duodenum is not ac companied by headaches temperature various infections of the joints coated tongue or any signs of sepsis The absence of such infectious signs in this patient s case raises a strong presumption aga nst the diagnosis of biliary tract infection

This presumption moreover is further strengthened by the absence of icterus To be sure large numbers of biliary tract infec tions exist without icterus but the absence of icterus the presence of constipation and the absence of signs of sepsis all point away from the gall bladder toward the stomach and duodenum

Lastly there is the matter of this individual s weight During the last two years he has lost 20 pounds and he weighs at least 25 or 30 pounds under what he should weigh if his weight were normal We can account for this loss not by infection but only by starvation either voluntary or forced or by lack of assimila tion In the absence of s gns of infection such weight loss points rather strongly toward organic disease of the stomach and duodenum

Some further considerations are important in connection with this case namely those considerations arising out of the union of both gastric ulcer and duodenal ulcer in the same patient We have been encountering with greater frequency of late possibly because of more careful surgical examination at the time of opera

tion and partly because of more careful analysis of the symptoms cases in which both ulcers of the duodenum and stomach are simultaneously present. When the ulcer of the duodenum develops first (and these cases are clearcut) the symptomatology consists chiefly of pain to the right of the epigastrium associated with tenderness in the duodenal area The pain comes on one to two hours after meals and is relieved by the taking of food When in the presence of such an ulcer of the duodenum a gastric ulcer develops the symptomatology of the gastric ulcer immediately comes to the front and completely disguises the symptomatology of the duodenal ulcer Indeed the gastric ulcer is a complete camouflage for the duodenal ulcer The pain of a gastric ulcer comes on immediately after meals and runs over merges into and becomes continuous with the pain of the duodenal ulcer coming one to two hours after meals The vomiting or regurgitation of the gastric ulcer replaces the absence of vomiting in the duodenal ulcer and so disguises the latter diagnostic symptom Constipation is a prominent feature in both conditions and affords us no means of differentiation The presence of ulcer of the stomach brings about pain on the taking of food even if the ulcer of the duodenum is present at the same time. The pain of ulcer of the duodenum is relieved by the taking of food If both gastric and duodenal ulcers are simultaneously present there will be pain on taking of food and no relief whatever when food is taken Thus again the symptomatology of gastric ulcer will cover that of duodenal ulcer

definitely that the duodenal ulcer was the first ulcer and that the gastric ulcer developed at such and such a time

On the other hand if the gastric ulcer is the first to develop and the duodenal ulcer develops subsequently we have no means whatever of making a double diagnosis The more positive symptoms of the gastric ulcer will absolutely cover up and conceal the underlying duodenal ulcer In such a case the only

possible way of discovering the presence of a duodenal ulcer is by *x* ray examination of the duodenal cap

This double diagnosis of gastric and duodenal ulcer must always be borne in mind in any given case The association of both gastric and duodenal ulcer is extremely common in the same patient. Quite a number of pure duodenal ulcers occur and quite a number of cases of pure gastric ulcer but there is a large number of patients who have both ulcers present By way of summary, when gastric ulcer is added to duodenal ulcer the diagnosis is easily made On the contrary when duodenal ulcer is added to gastric ulcer no suspicion of it will enter the examiner's mind except such suspicion as may be aroused by the fluoroscopic examination or the skiagrams

Diagnosis —In a case of this sort the first procedure in the diagnosis after careful examination into the history, is the determination of the acidity of the stomach contents and the presence or absence of blood in the gastric contents or stools The Ewald test meal was given this patient upon entrance This showed a total acidity of 53 free hydrochloric acid of 37 Some mucus was found in the gastric juice gastric in origin, although the specimen was mildly soiled by a little mucus which had been swallowed The microscopic examination showed no red blood cells but a large number of starch granules and an occasional yeast cell The stomach contents showed no blood Examination of the meat free feces made the same day showed blood to be present Examination of the urine gave a specific gravity of 1011 faintly acid reaction absence of albumin and sugar The urine contained no red blood cells casts or pus Examination of the blood showed 4 900 000 red cells 9400 leukocytes and 80 per cent hemoglobin

After these laboratory findings were obtained the patient was sent to the *x* ray room for further examination The fluoroscopic examination showed the barium and buttermilk passing freely down the esophagus into the stomach In the stomach the barium sank to a very low level almost to the left iliac fossa because of the great elongation and downward displacement which is of the fishhook type While the fluoroscopic examination was

being made the pylorus was manipulated by pressure on the abdomen It was found to be rather fixed Examination of the movements of the stomach showed an exaggerated hypermotility which is possibly due or even probably due to the hyperacidity After the fluoroscopic examination plates were taken immediately and also at intervals of fifteen minutes and five hours The first plate taken immediately after the fluoroscopic examination showed a very much elongated stomach with a large gas bubble at the top The stomach extends almost vertically on the left side of the body from the diaphragm to the left iliac fossa The pyloric area is somewhat contracted There is no distinct duodenal cap though the plate clearly shows the bismuth passing into the duodenum. The second plate shows a very marked contraction in the region of the pylorus It will be noticed that a thin stream of bismuth is issuing from the antrum pylorici and passing into the duodenum and that this stream is interrupted by a little patch of bismuth which shows white in the plate and which probably indicates the presence of an ulcer lying in the duodenum behind the pylorus The third plate shows a rather marked five-hour retention During five hours the barium has passed through the small intestine into the large and transverse colon but there is still a [illegible]
stomach at the end of five [illegible]
delay in emptying of the st[illegible]
or organic. In view of the presence of an ulcer apparently filled with bismuth and in view of the lack of the duodenal cap an ulcer of the duodenum may well be present

On the other hand the history of the case is very clearly an ulcer of the stomach We base this latter conclusion upon the fact first that there is a loss of weight much greater than usually occurs in ordinary duodenal ulcer second that the pain is epigastric that it appears fifteen minutes to a half hour after meals and that it is made worse by the ingestion of food Furthermore it is a burning heavy feeling constant and not wave like or rhythmic thus ruling out pylorospasm Associated with this pain there is also tenderness located in the epigastrium where we should expect it to be in ulcer of the stomach We also base the

diagnosis of ulcer of the stomach upon the presence of regurgitation of food and nausea these symptoms not being present in ulcer of the duodenum unless the ulcer of the duodenum is also associated simultaneously with ulcer of the stomach On the other hand we are not prepared to say that the patient has no ulcer of the duodenum Our reason for this statement is that the *x* ray plate *with its absence of duodenal cap and apparent localization* of a patch of bismuth in the duodenum speaks strongly for duodenal ulcer

As I said before if an ulcer of the duodenum develops when an ulcer of the stomach is already present there is no means of deciding just when this duodenal ulcer actually first developed If, however a man has a duodenal ulcer and then develops a gastric ulcer it is quite easy to say when the gastric ulcer first appeared In this case we will have to make a diagnosis of ulcer of the stomach with suspicion directed toward the duodenum by reason of the *x* ray plates alone and not by reason of any symptomatology We also are of the opinion that the plate showing a retention of barium at the end of five hours indicates a blockade only partially to be sure at the pylorus

What shall be done in such a case in the way of treatment? This patient has been treated for a long period in a way which ought to have cured an ordinary ulcer He however has been in nowise improved On the contrary he is continually losing weight even up to the present time and the pain is as bad as ever Will gastrojejunostomy help him? Yes provided the gastric ulcer lies close to the pylorus on either the gastric or duodenal side We have no reason for believing that his ulcer is in the fundus or on the greater curvature or anywhere than very close to the pylorus and well within the antrum pylorici If we believed that the ulcer was located on the greater curvature or on the lesser curvature or in the fundus we certainly would not advise operation It is because we believe the ulcer lies quite close to the pylorus that we think an operation should be done

What will the operation accomplish? It will give the ulcer a chance to heal while food is passing the new way from the stomach into the jejunum An ulcer located at or near the py

lorus either on the gastric or duodenal side, is constantly irritated by the excessive acid in the stomach and is kept in a continuous state of activity If it can be spared this continuous irritation it has a marked tendency to heal Medical and dietetic treatment in this patient has been of little avail in Texas and at his home We have not advised that it be carried out here On the contrary, we have referred him to the surgical department for operation.

DR. E WYLLYS ANDREWS (operating) I have studied the plates shown by Dr Mix, and I agree with his conclusions and add one other I am sure I see the ulcer hole packed with bismuth in two of the skiagrams It is in the upper duodenum

We believe these cases are surgical only after they have had a thorough working out medically As we raise the stomach you notice the pyloric ring and the anatomic distribution of the pyloric vessels There is a point 4 cm. below that ring at which there is a hard, scirrhous cicatrix (Fig 1, 1) It is 1 x 1½ cm in size and not at the pylorus so that the symptoms of obstruction must have

normal in position and consistency The gall bladder is somewhat large and soft and on pressure slowly empties itself There are no gall-stones to be felt in the gall bladder or bile-ducts The liver edge is sharp and in normal position.

This case belongs to that type of ulcer of the first portion of the duodenum which is often hopeless without surgery I see dozens of cases which have not been benefited by medical treatment, or only temporarily cured. We advise this operation for the purpose of short-circuiting the contents of the stomach into the jejunum I will raise the colon and lift it forward in order to reach the jejunum properly below I can reach the jejunum

Fig. 1.—The three-stitch method 1. Contracted pylorus and scar of duodenal ulcer 2 Opening in mesocolon. Wall of stomach drawn through ready for clamp Jejunum has been clamped. Note jejunal fossa and "no loop 3 Both clamps in position. Insertion of serosorous or first of three suture lines

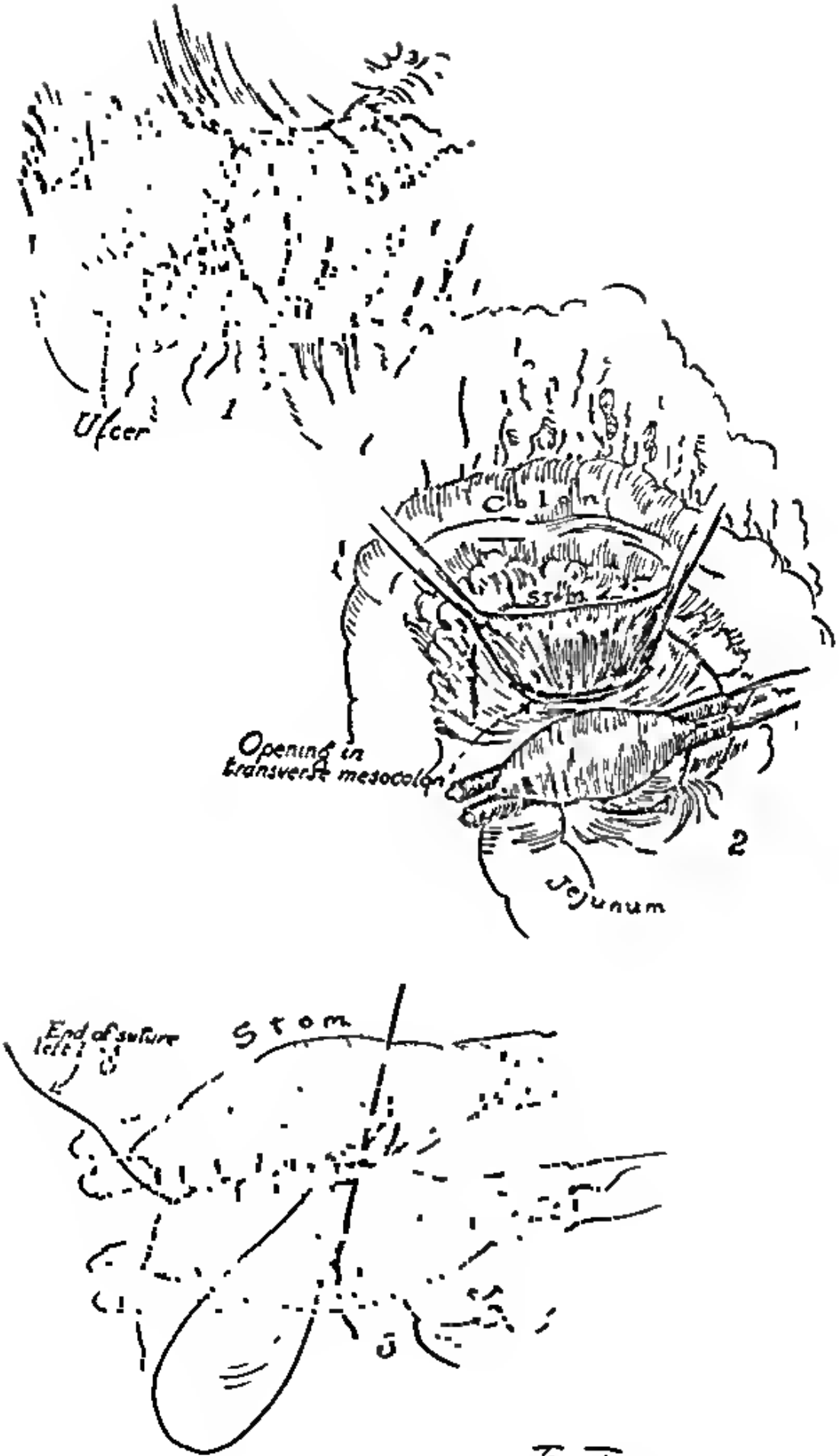
Ulcer
1
Clam
Stom
Opening in transverse mesocolon
2
Jejunum
End of suture left
Stom
3
Tom Jones —

Fig 1

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flowed over it. Further exploration reveals that the pancreas is normal in position and consistency The gall bladder is somewhat large and soft and on pressure slowly empties itself There are no gall stones to be felt in the gall bladder or bile-ducts The liver edge is sharp and in normal position

reach the jejunum properly below I can reach the jejunum

[illegible] pylorus and scar of duodenal
awn through ready for clamp
no loop 3 Both clamps
suture lines

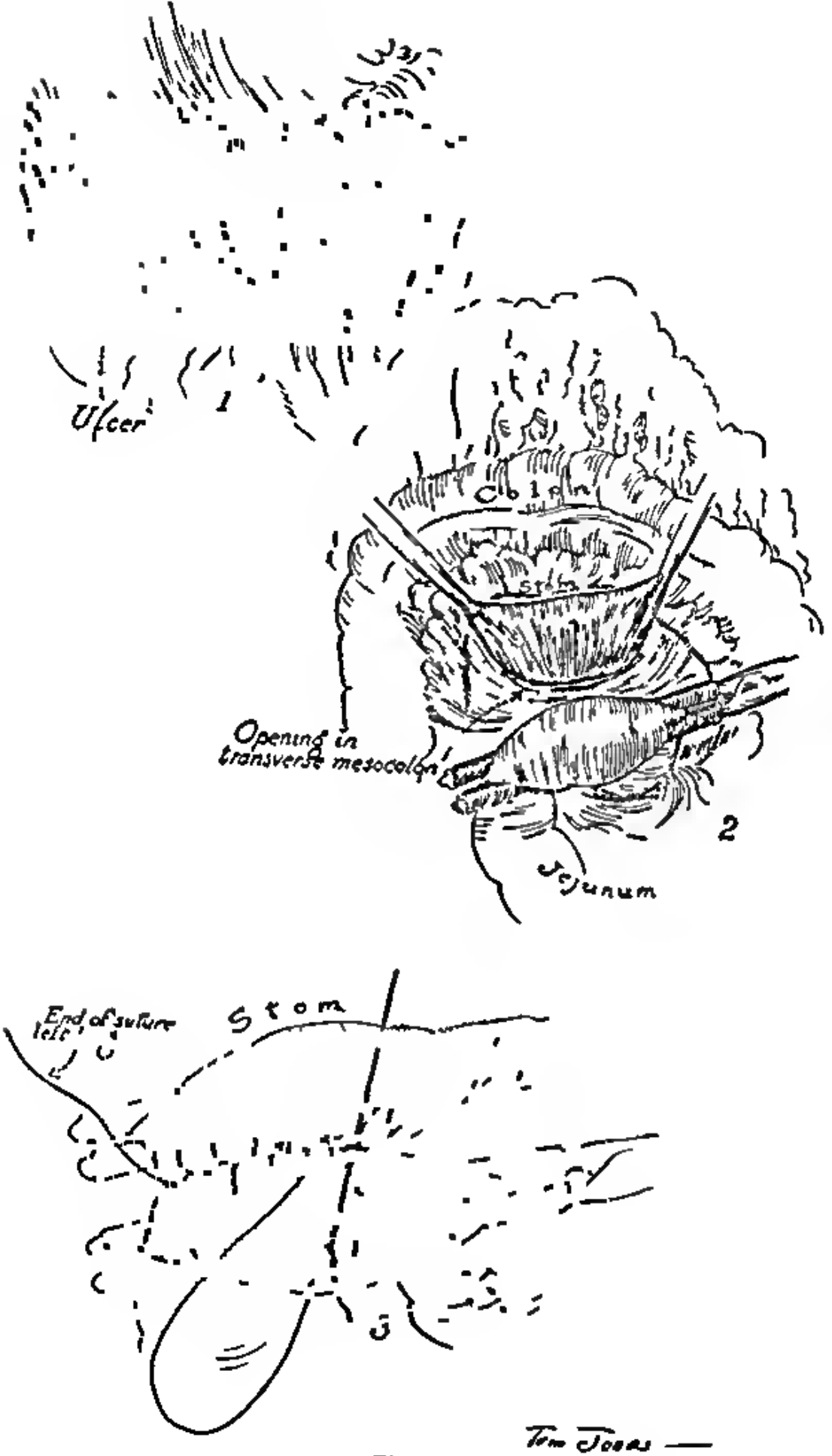
Ulcer
1
Colon
Stom
Opening in transverse mesocolon
2
Jejunum
End of suture line
Stom
3

Fig 1

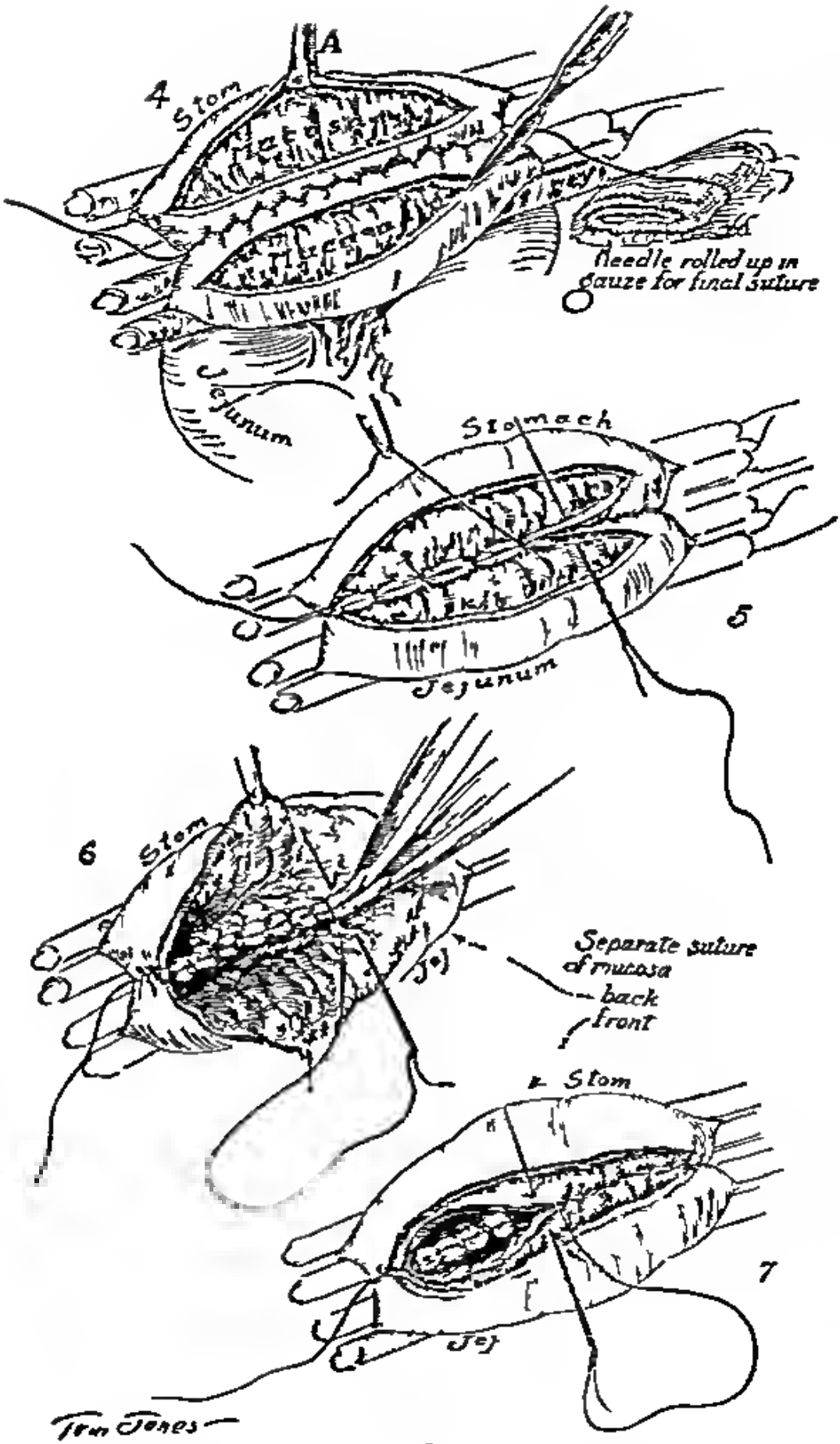
A
4
Stom
Needle rolled up in gauze for final suture
Jejunum
Stomach
5
Jejunum
6
Stom
Jej
Separate suture of mucosa
back
front
Stom
7
Jej
Fran Jones

Fig 2

guided by the sense of touch, running my finger along until I feel the ligament of Treitz I draw this loop of jejunum up with my finger We will make a short loop here, sometimes called a "no-loop," that is, we draw the jejunum out until there are no bowel loops intervening between the duodenojejunal junction and the point which we select for anastomosis It is very important in this anastomosis to reach a part of the posterior wall of the stomach near the pyloric end In order to do this, I open through the transverse mesocolon by blunt dissection We just tear it until the stomach wall appears Now we try to get that part of the stomach wall which is near the pylorus (Fig 1, 2) I do not quite like the first place at which I penetrate the mesocolon because of these adhesions We will go farther toward the smaller end of the stomach Now you see we are close to the pylorus—just how near we determine when we rotate the colon downward and look above it

This operation will consist of an anastomosis made with three separate rows of sutures First row We put in a continuous Lembert stitch joining the stomach and bowel behind (Fig 1, 3) Second row With a sharp knife we incise the serosa and muscularis for a distance of about 2½ inches on the stomach parallel to and about 1 cm from the row of Lembert sutures, and then duplicate this incision on the jejunal side We then make a couple of flaps on each side by pulling the edges of the incision through the peritoneum and muscularis gently apart (Fig 2, 4), so that we may make a sort of edge-to-edge union of the contiguous gastric and jejunal flaps—our second row of sutures These are interrupted silk sutures The placing of interrupted sutures is somewhat more time consuming than is the case with a running suture, but the result is very satisfactory (Fig 2, 5) I have never had one of these leak This is practically a return to the original Billroth three layer stitch It is the only method I have

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Fig 2—4 and 5 Formation of the seromuscular flaps and placing the second row of sutures Line steadied by using last stitch as guy rope Note Lembert suture wrapped in gauze and laid aside until needed to complete the first row of sutures. 6 and 7 Stitch three Mucosa opened and united by running stitch behind and in front.

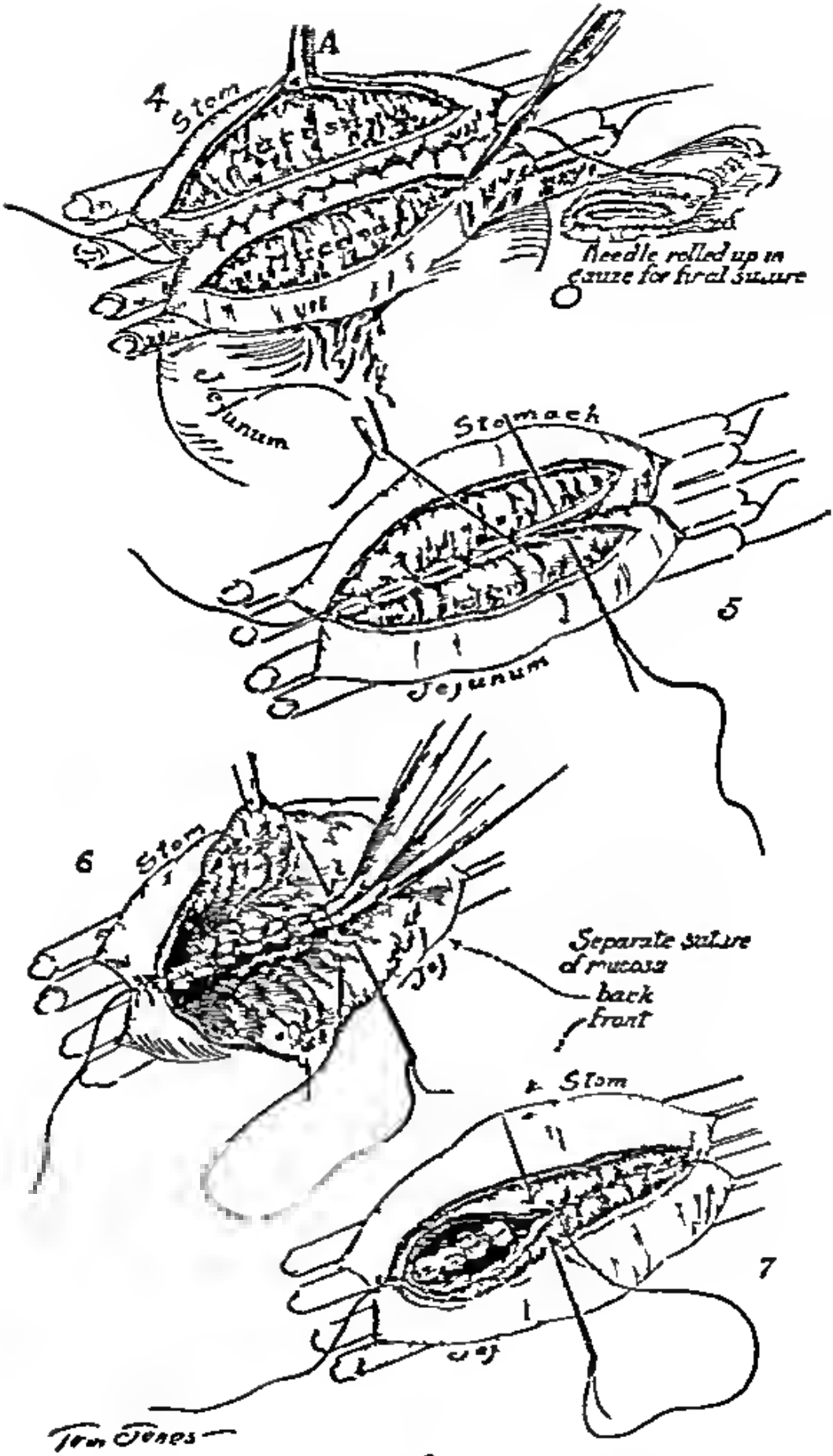
A
4
Stom
Needle rolled up in gauze for first suture
Jejunum
Stomach
5
Jejunum
6
Stom
Separate suture of mucosa
back
front
Stom
7
Jej
Jejunum
Tom Jones

Fig 2.

ever used in which I have had no leak It takes much longer than other methods but it is more satisfactory in the end Third row Here is the mucous membrane which we now lay open We have already approximated the serosa This is the mucosa stitch We put in three stitches and then take a back stitch to prevent puckering If there is no puckering of the suture line there will be no contraction of the new stoma This stitch will have to go all around the bowel Now I have a complete circle of the mucosa (Fig 2 6 and 7) We start with our interrupted stitch again that is we complete the second row of sutures uniting the two remaining flaps of peritoneum and muscularis (Fig 3 8) I think there is some value in having part of the cut surface left at this point as is done by these interrupted sutures rather than an inverted peritoneum as is the case when a continuous stitch is used Now I take off the intestinal clamps This needle was on one end of our first serous stitch that is the Lembert which constituted our first row of sutures We continue it over the anterior aspect of our anastomosis as a modification of the Lembert We lock this at each third stitch so that it will not pucker It is a seroserous right angle stitch (Fig 3 9)

Here is our stomach Here is the hole in the mesocolon We want to fasten the margin of that opening in the mesocolon to the stomach This is done carefully so that there cannot be any possibility of a hernia Here is the finished anastomosis (Fig 3, 10)

We do not think we have finished these operations unless we occlude the pylorus There are several ways in which that may be done I shall be content with simple ligation I do not expect that will ever want to be opened but it can be Brewer of New York inserts aluminum rings The method which I show you happens to be a very conservative and safe one (Fig 4 1–4) Another very good method of producing occlusion is to divide the serosa and muscularis stretch them apart and sew up the mucosa

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Fig 3—8 Serous and muscular cut edges united by interrupted stitches in front of stoma (completion of second row of sutures) 10 Site of anastomosis secured to opening through mesocolon (Note close proximity to ligament of Treitz and absence of jejunal loop)

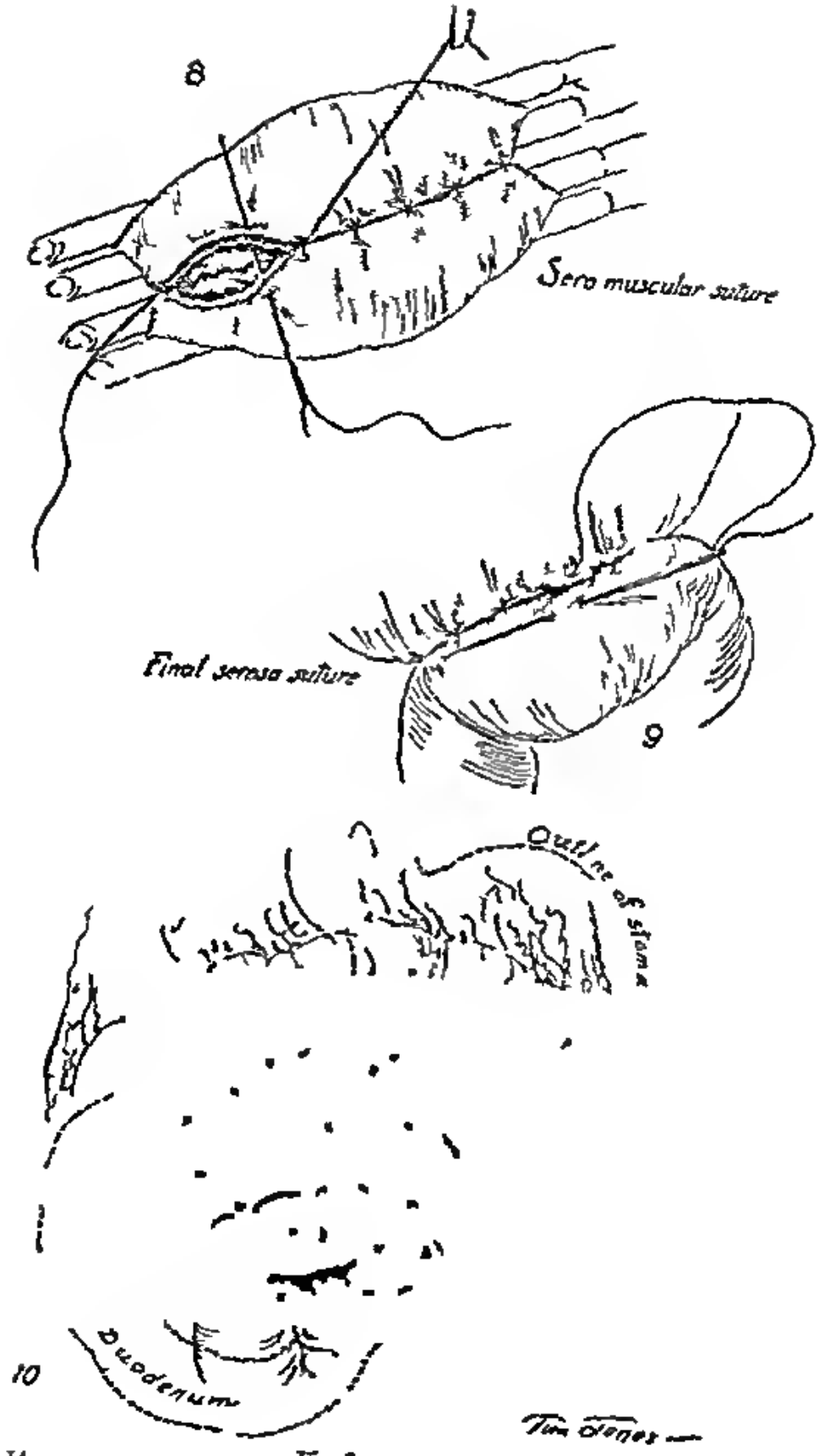
8
Sero muscular suture
Final serosa suture
9
Outline of stoma
10
Duodenum

Fig 3

afterward reuniting the outer walls Last summer we cut down on a pylorus and removed it because it was the size of a hen s egg hard and tumor like and we thought the patient had carcinoma Much to our surprise the microscopic report was not carcinoma but chronic ulcer We believe in certain cases in removing the pyloric ring and pieces of the stomach—what Rodman called the removal of the ulcer bearing area—in simple ulcer At any rate we insist that every case of duodenal ulcer or ulcer even of the stomach or pylorus must have an occlusion operation

Here is what we were up against in some of these cases before we practised pyloric exclusion In the first place a certain amount of the sudden relief we get from gastro-enterostomy is due partly to the regurgitation of bile and pancreatic fluid as proved by Patterson At any rate drainage causes marked and sudden relief and great improvement The result of that improvement is that the duodenum or even the stomach wall is relieved of irritation and slowly during the first few months or year the ulcer heals The ulcer heals and the stoma functionates for a while but eventually the pylorus opens up again and then curiously enough the stoma decreases much in size or may even close entirely Why the false opening will close is very hard to say It does however in many cases although those are the cases in which there is not already an organic obstruction With the re-establishment of the pre-operative anatomic conditions however the ulcer area is subjected to renewed irritation which not infrequently leads to the return of symptoms When the pylorus is occluded however the artificial stoma does not close and the ulcer area is permanently protected from the old irritation

Fig 4 —Details of pyloric occlusion 1 Crushing with Péan heavy jawed forceps 2 Ligation of crushed layers 3 Inversion by row of stitches 4 Inversion suture complete

Tom Jones

Fig. 4.

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CLINIC OF DR A J OCHSNER

AUGUSTANA HOSPITAL

BASAL-CELLED EPITHELIOMA OF NECK, EXCISION WITH CAUTERY

Summary Pat ent aged seventy years present ng ulcerating tumor of the skin in the region of the masto d process and the angle of the jaw removal by cautery the cautery min mizes local recurrence after operation by preventing implanta tion of tumor cells dangers of removal of sections before operation for diagnos- t c purposes necessity of clean thorough d ssect ons

History —The patient a married woman of seventy years was admitted to the hospital September 24 1917 because of a growth under the left ear

Her family past and menstrual histories are negative She was married at seventeen and has had 10 children 5 of whom are living

For the past six months there has been a lump growing under the left ear It appeared as a pimple on the skin and gradually increased in size There has been no pain connected with it and for the past two months it has been discharging a small amount of serum

Physical Examination —The patient is a well developed and moderately obese elderly woman with a good color and no evi dence of cachexia All the teeth are missing On the neck midway between the angle of the lower jaw and the mastoid proc ess is a rather hard solid mass the size of a hen s egg which is somewhat spindle shaped and whose two poles are in the axis of the sternocleidomastoid muscle The overlying skin is attached to it There is but slight attachment of the tumor to the deeper structures Just above the middle of the tumor there is an ulcera tion 1 5 cm in diameter extending through the skin and discharg ing a thin yellowish fluid There are no other lymph glands palpable anywhere else in the neighborhood

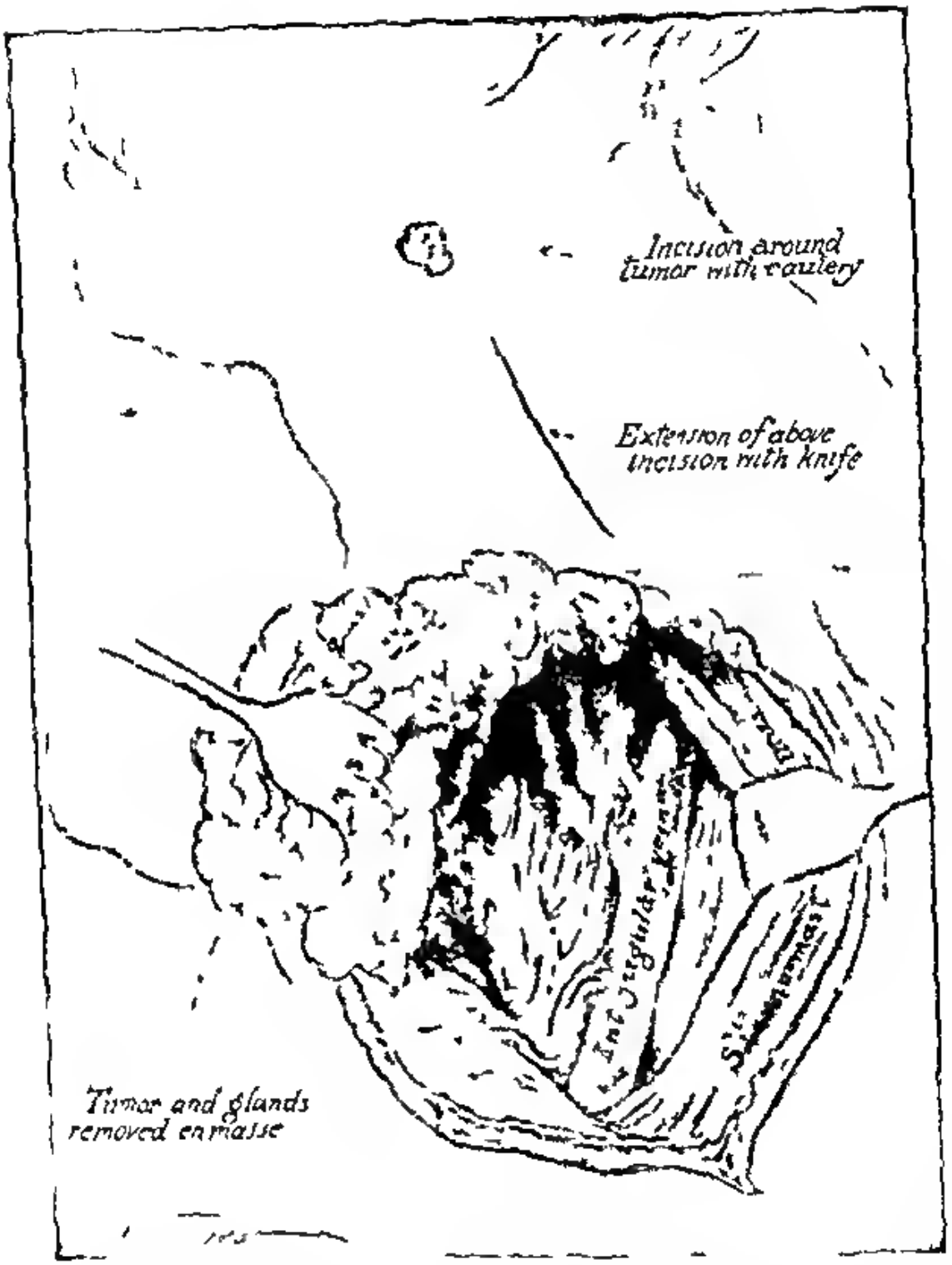

Fig. 8—Excision of epithelioma of the neck by cautery. Above (Fig. 1), lines of incision and appearance of tumor. Below (Fig. 2) the tumor with the underlying deep fascia and lymphatics being removed from below upward. Note clean dissection of the veins.

visited the city in Iowa from which the patient had come and in some way she learned that I was at the hotel and called upon

The lungs and breast are negative The heart rate is 84 per minute There is a strong systolic and a soft diastolic blow heard best at the apex and transmitted to the base and the great vessels of the neck. There is a skip of systole of the ventricle every five to ten beats The heart is somewhat enlarged to the left. The abdomen is negative

Comments and Operation.—DR. OCHSNER (September 25 1916) This patient has been anesthetized with ether and as I am to remove this growth with the cautery we will cover the face with a wet cloth

You observe a swelling here 5 cm in diameter extending from the lobe of the ear downward In order to prevent local implantation and transmission of this carcinoma I am performing this operation entirely with the electric cautery I believe that I will be able to remove this entire growth and that our patient will be free from the possibility of recurrence You see I am making my incision (Fig 5 1) fully 2 cm away from the edge of the growth I am right up against the facial vein here Now I am going to disinfect my hands and dissect down with the knife because there cannot possibly be an infection of the skin below this point (Fig 5 1) I make my incision right through the skin with the cautery and make this incision with the knife

It may seem useless to go to all this trouble but I see a gentleman every month or two who had a recurrent carcinoma in exactly this same position which had been removed with the knife twice before he came under my care twelve years ago Then I made this operation and the man is perfectly well I have another case from whom I obtained a report just a few days ago on whom I performed this same operation for melanotic sarcoma that had been removed twice Once it had been removed by the greatest surgeon in the country in his particular field Then it recurred and was operated by one of the professors here in Chicago and then came back. Professor Senn was the previous surgeon Then while he was on his vacation the patient came back and it did not seem as though it would be wise to wait until Professor's Senn's return from Europe so I undertook the removal That was in 1892 In 1904 twelve years later I

separate microscopic section of the duct of the salivary gland so as to make sure that there was no infection

When you elevate the head, as we have here in this patient, the anesthetic remains active for a considerable time, so we can finish the use of the cautery entirely before it will be necessary to give her any further anesthetic

A number of surgeons have suggested the use of boiling water in these wounds for the purpose of sterilization against the malignant cells which might still be present Of course having removed it carefully by means of the cautery this is not so important

We will now close the wound with horsehair after applying this small strip of iodoform gauze in the lower corner to allow serum to escape during the first twenty four hours

On account of her age (seventy years) she will be given a head rest at once and tomorrow will be allowed to sit up in a chair It is necessary that aged persons be not made to lie flat after anesthesia because of the great liability to pneumonia or pulmonary edema

NOTE.—Microscopic sections of the tumor removed proved the tumor to be a basal celled epithelioma The patient received the x ray treatments as outlined and left the hospital on the fourteenth day after operation

me She was perfectly well That was twelve years after the last operation That is a case that without this operation would undoubtedly have been lost and therefore I believe it is perfectly proper for us to perform the same operation on this patient

Here you see I have exposed the deep jugular vein from the mastoid process to the clavicle I am removing all the fat and all the lymph nodes so as to leave the jugular vein entirely stripped of fat and fascia I am very careful not to tear the little branches of the jugular vein out of their insertions in the vein You see we are getting this mass of fat and lymph glands free from the jugular vein Now you see how perfectly we have laid bare the entire field (Fig 3 ?)

For one week before the operation this patient has received intensive x ray treatments We will give her six more intensive x ray treatments beginning the first today The glands attached to the deep jugular vein just below the parotid gland are now removed Now if not ready to make such an extremely extensive operation in a case of this kind one must never touch these cases because one is apt to stir up the cancer cells and make them grow faster and thus do the patient a great deal of harm You can see the jugular vein moving filling and emptying with each respiration You see the facial vein here We almost always find a gland at that point just between the facial vein and the jugular vein We must always look for this gland Here I am right up against the cricoid cartilage so that I have removed every particle of suspicious tissue

We never remove portions of any growth previous to opera

to the opening up of the space during the removal of the piece for preliminary microscopic examination

I am going to remove the submaxillary salivary gland because of its proximity to the edge of our tumor We will make a

REPAIR OF POSTOPERATIVE VENTRAL HERNIA

Summary Causes of postoperative hernia indications for operation obesity a serious complication—its management methods of repair—technic in present case after treatment

History —The patient is a married woman aged forty two, who entered the hospital October 16 1917 Her mother is living but has two herniæ and spinal trouble Her father died of Bright's disease at the age of sixty five She has 5 brothers and 5 sisters living and well Two aunts died of cancer There is no tuberculosis in her family

The patient states that she has had a large swelling in the groin for about five years This came on within a few months after an operation for appendicitis She complains of a general soreness throughout her abdomen when she is on her feet or does heavy work The swelling disappears when she lies down She has had a dull aching pain in the left side of the chest off and on for four years which has been somewhat worse during the last two weeks She has urinated three and four times a night since the appendix operation She had one miscarriage thirteen years ago

Menstrual —Began at twelve regular twenty eight-day type, painful on first day Last period October 1 1917

Appetite is good sleeps well has been moderately constipated during the last three months

Past History —Had scarlet fever diphtheria and measles when a child no other illnesses except chronic appendicitis Had a tonsillectomy fourteen years ago, a turbinectomy five weeks ago

Physical Examination —The patient is a well-developed, somewhat obese adult with a ruddy color Scleræ are clear Pupils are equal and respond to light and accommodation Nose and ears are negative Tongue is clean Tonsils have been

as he desires if there is a tendency to strangulation of the pro truding intra abdominal structures if the covering of the hernia is so thin that there is danger of rupture if the coexisting ad hesions threaten to cause disturbances of the digestive apparatus, if there has been a tendency to strangulation of the intestines because of these adhesions of if the appendix has been left in place at the time of the primary operation it is well to relieve the condition by means of an operation

In many of these patients the presence of extreme obesity seems to be a contraindication to operation but by careful and persistent d eting it is practically always possible to reduce the amount of fat present in the abdominal wall to a marked extent in a relatively short time The important feature in preoperative dieting seems to lie in the selection of a varied diet so that the patient receives a sufficient number of calories each day to main tain a healthy condition but the food supplying these calories should be of a character not to produce more fat so that the patient may consume her own fat while she is augmenting her physical strength

We have a carefully worked out diet consisting of three break fasts three luncheons and three suppers Of each group the patient may choose each day one for her breakfast one for her luncheon and one for her supper Aside from this she is per mitted to add an orange or half a grape fruit to any meal if she chooses In this way we have reduced the weight of patients before operating from 20 to 100 pounds without interfering with their strength

Unfortunately many of these patients are not able to walk because of the hernia Those that are able to walk will of course reduce the amount of fat in the abdominal wall more rapidly Hot baths and massage are also applied and the amount of water consumed is carefully limited A little lemon juice is added to the water which the patient drinks between meals

Reducing the amount of fat in the abdominal wall not only facilitates the operation greatly but it also places the tissues in the abdominal wall in a much better condition for obtaining solid union

removed. Teeth in fair state of repair although several molars are missing Neck is negative

Chest—Heart and lungs are negative

Abdomen—There is a broad puckered scar at the site of the McBurney incision A bulging mass the size of a grape fruit protrudes from the right lower quadrant when the patient stands or sits but disappears when she lies down although the right lower quadrant remains more prominent than the rest of the abdomen Defects in abdominal wall can be felt below and on each side of the scar Moderate tenderness is present all over right lower quadrant no rigidity

Vagina—Perineum intact cervix small uterus of moderate size good position An indefinite mass apparently the size of a large orange is felt in the right iliac fossa and this is continuous with the uterus

Rectum—Three small external hemorrhoids are present.

This patient has a ventral hernia 10 cm in diameter resulting from an operation for the relief of suppurative peritonitis following acute appendicitis with perforation The operation which was performed five years ago required free drainage through the abdominal wall Such herniæ are of very common occurrence in cases in which the condition found at the time of the operation necessitates free abdominal drainage Occasionally it is possible to unite the abdominal wall after the suppuration has subsided by means of silkworm-gut sutures but ordinarily the deep suppuration persists so long that secondary closure of the abdominal wound does not succeed in preventing the formation of a ventral hernia

Following operations for aseptic intra abdominal conditions in which the abdominal wall can be closed without the use of drainage herniæ almost never occur at the present time because the different layers of the abdominal wall are carefully approximated so that the abdominal wall is at least as strong at the point at which the operation was performed as it is at any other point

Indications for Operation.—In cases in which the hernia gives rise to distress or disables the patient from performing such labor

only tissues holding the intestines in place in this case are the skin a thin layer of fascia and the peritoneum so that the entire thickness is less than 1 mm We are careful to begin this incision as far up as possible in order not to risk injuring any loop of intestine which might have become adherent The index finger of the left hand is then introduced through this opening the adherent omentum is pushed to one side and the abdominal wall is then opened the entire length of the hernial sac The intestines and the omentum show a tendency to protrude through this opening so we will elevate the foot of the table so as to place it at an angle of 45 degrees This will permit the intra abdominal contents to slide up underneath the diaphragm which will facilitate the succeeding steps of the operation greatly

At each end of this wound is found a pouch of peritoneum which served as a hernial sac Each of these sacs is 7 cm in diameter One sac is located between the transversalis fascia and the right rectus abdominis muscle and the other between the transversalis fascia and the internal oblique abdominis muscle, pushing the conjoined tendon outward The bladder protrudes into the latter sac which undoubtedly accounts for the bladder symptoms mentioned in the history Each of these sacs is filled with omentum which is tightly packed into its cavity and the end of one of the pieces of omentum is adherent to the rim of each of these sacs (Fig 6 1 3) The peritoneum containing these sacs is dissected out by grasping its edge by strong forceps and pushing against the outer wall with a piece of sterile gauze

This having been accomplished we have an inner and an outer layer of abdominal wall which is lined on its lower surface with peritoneum and transversalis fascia and on its outer surface with aponeurosis of the external oblique abdominis muscle The inner border of the wall is now exposed by placing sharp pointed retractors about 10 cm from its margin and pulling these outward so as to make it possible to suture the edge of the outer margin underneath the inner margin about 10 cm from this edge This is accomplished as shown in the illustration by means of interrupted chromicized catgut sutures placed just close enough to each other to thoroughly close the suture line to prevent any

Preparation for Operation.—These cases differ in no way from the usual operation for patients upon whom an abdominal section is to be made but special care must be taken not to give the patient any nourishment for one or two days previous to the operation, which might have a tendency to produce quantities of gas Moreover, the alimentary canal should be thoroughly emptied by means of castor oil and soap-suds enemas On the day previous to the operation nothing but broth and an abundance of water are given by mouth.

Kinds of Operations —Whenever it is possible to expose all of the layers of the abdominal wall so that each layer can be distinguished on both sides of the incision we choose this as the first step of the operation This can be done most easily when the ventral hernia appears in the median line, or when during the primary operation the rectus muscle has been split longitudinally

Having exposed all of these layers silkworm-gut sutures are passed down through all of the layers to the peritoneum but not through it These sutures are placed about 2 cm apart and are left untied for the present Then the peritoneum and transversalis fascia are sutured separately by means of fine catgut sutures The muscular layer is next sutured in the same manner and then the aponeurosis is sutured with chromicized catgut Lastly the skin is sutured with horsehair, and then the silkworm-gut sutures are tied over all to serve the function of safety sutures For a time we omitted these deep silkworm-gut sutures and it hap-

of this accident, but we have returned to the former plan of placing the silkworm-gut safety sutures that has just been described

suture each layer in its proper place Consequently we will employ a method which we have found most useful in similar cases

Technic.—We first excise the scar tissue in the skin The

omentum or intestine from slipping through between these sutures (Fig 7, 4) It is important to suture the ends of this margin with especial care in order not to leave a weak point in this part of the suture line The free margin of the inner flap is now carried over the anterior surface of the outer flap, as shown in the illustration and is held in this position by a series of carefully applied interrupted chromicized catgut sutures (Fig 7, 5) The greatest care is again taken to adjust the ends of the margin so as to make this part of the reconstructed abdominal wall especially strong This leaves the space formerly occupied by the hernia covered with two layers of carefully adjusted abdominal wall (Fig 7, 6) and makes a recurrence practically impossible The skin wound is now sutured with horsehair and an ordinary dressing is applied

After treatment—At the conclusion of the operation a stomach tube is introduced, and the stomach is carefully washed out with water at a temperature of 105° F If this step is neglected the mucus which the patient has swallowed during the operation may decompose and give rise to gaseous distention

The patient is given sips of hot water immediately after the operation and is permitted to chew paraffin for the purpose of stimulating the salivary glands She is given normal salt solution by Murphy s proctoclysis continuously for two hours, with interruptions of two hours In case of pain, morphin is given hypodermically

On the third day the patient receives broth by mouth, on the fifth day gruel, then buttermilk Milk is not given until the beginning of the second week and then only in combination with milk of magnesia or lime-water in order to prevent its clotting in the stomach Solid food is not given until the end of the second week in order to keep the intra abdominal pressure at a minimum

The patient is encouraged to move about in bed from the beginning and is permitted to sit up at the end of the tenth day

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Fig 6.—Postoperative ventral hernia 1 Line of incision through old incision 2 The peritoneum opened showing the omentum filling the hernial cavities 3 Large hernial sacs that had forced their way between the transversalis and rectus muscles.

Fig 6.

A cleansing enema is given every morning after the second day, and from the tenth day on 1 ounce of mineral oil is given every morning

We are especially pleased with this method because of its being exceedingly simple and easily carried out, and because it leaves the weakened area of the abdominal wall splendidly reinforced

NOTE —In this case multiple fibroids of the uterus were also found one of which was lodged in the right broad ligament. This condition was successfully treated by intensive x rays A clinic on the use of x rays and radium in uterine fibroids will be given in a later number of the SURGICAL CLINICS

Fig 7—4 The sacs have been freed and redundant tissue excised The peritoneum on the median side of the wound is being retracted while the outer portion is sutured with interrupted stitches. 5 The imbrication being completed thus giving a double layer of dense fascia and muscle 6 The subcutaneous fatty structures approximated to obliterate spaces favorable to the collection of serum.

Fig. 7

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SARCOMA OF THIGH WITH METASTASES IN VASA DEFERENTIA. TECHNIC OF VASECTOMY

Summary Recurrence of fibrosarcoma in old scar two years after primary removal with the co nc dent appearance of palpable nodules pain and tenderness in va a deferent a vasectomy—the small incis on o er spine of pubis sociologic value of vasectomy

THE patient a married man of thirty four years was admitted to the hospital for the first time March 24 1914

His family and past histories were negative

At that time he complained of a large mass on the left leg which had been present for three years The mass had gradually increased in size until at the time of examination it was about the size of a child s head There was no pain except when lying upon the mass It had always been more or less hard There was no discoloration of the skin overlying the mass and the skin could be moved about freely over it It caused no inconvenience other than pain on long continued pressure

The examination of the patient was negative except for defective vision in both eyes and a tumor of the lower third of the outer surface of the left femur The circumference of the leg at the largest portion was 26½ inches The tumor mass was hard did not fluctuate and was apparently connected with the bone (Fig 8 1)

The patient was operated upon March 25 1914 A lateral incision was made extending from the outer condyle of the femur to the spina iliaca anterior superior The skin was carefully dissected off the tumor and then the tumor and a portion of the muscle on the outer surface of the leg were removed *in toto* The incision was closed with horsehair without drainage

Microscopic examination of the tumor showed it to be a spindle-cell fibrosarcoma

The patient returns to the hospital now because the tumor which was removed in March 1914 is recurring in the same position There is no pain nor ulceration

For the past two years he has been having pain in the testicles which has recently been getting worse The pain comes on when he sits down If he stands up it goes away There is no pain or burning on urination and no sudden stoppage of the stream Sometimes the testicles swell up at the same time he has the pain There is no hernia and he denies venereal infection

Examination shows that his eyes have multiple corneal opacities He is having an iridectomy done on both for visual purposes The tonsils are submerged tongue is coated teeth in fair condition and breath is foul The chest heart and lungs are negative There is a nodule the size of a walnut just above and to the outer side of the knee It is situated immediately below the site of the previous incision and is movable The scar is long and broad

Rectal examination is negative The vasa deferentia are distinctly palpable contain many hard nodules are quite tender and appear to be the site of constant annoying pain

He was operated on November 15 1916 The tumor mass was excised from the lateral surface of the knee It was the size of a small plum sharply demarcated hard and fibrous There were a few small nodules of a similar substance in the surrounding tissues These nodules averaged 0 5 cm in diameter and were sharply defined They also were removed

On December 8 1916 a cystoscopic examination was made A catheter was passed with ease Tenderness was elicited on passing through the prostatic urethra The bladder presented a marked grayish corrugated appearance indicative of a low grade inflammatory condition The ureteral openings were not seen due to the ragged appearance of the bladder wall No hyperemia stones or masses were present

Operation —Dr. Ochsner (December 18 1916) The region of the sarcoma has been treated with x ray since the operation and he has no signs of a recurrence The growth itself did not seem very malignant It was a spindle-cell fibrosarcoma which did not seem to show a great tendency to malignancy and it is quite possible that the patient will be permanently well The thing he complains greatly of now is pain in his vasa deferentia

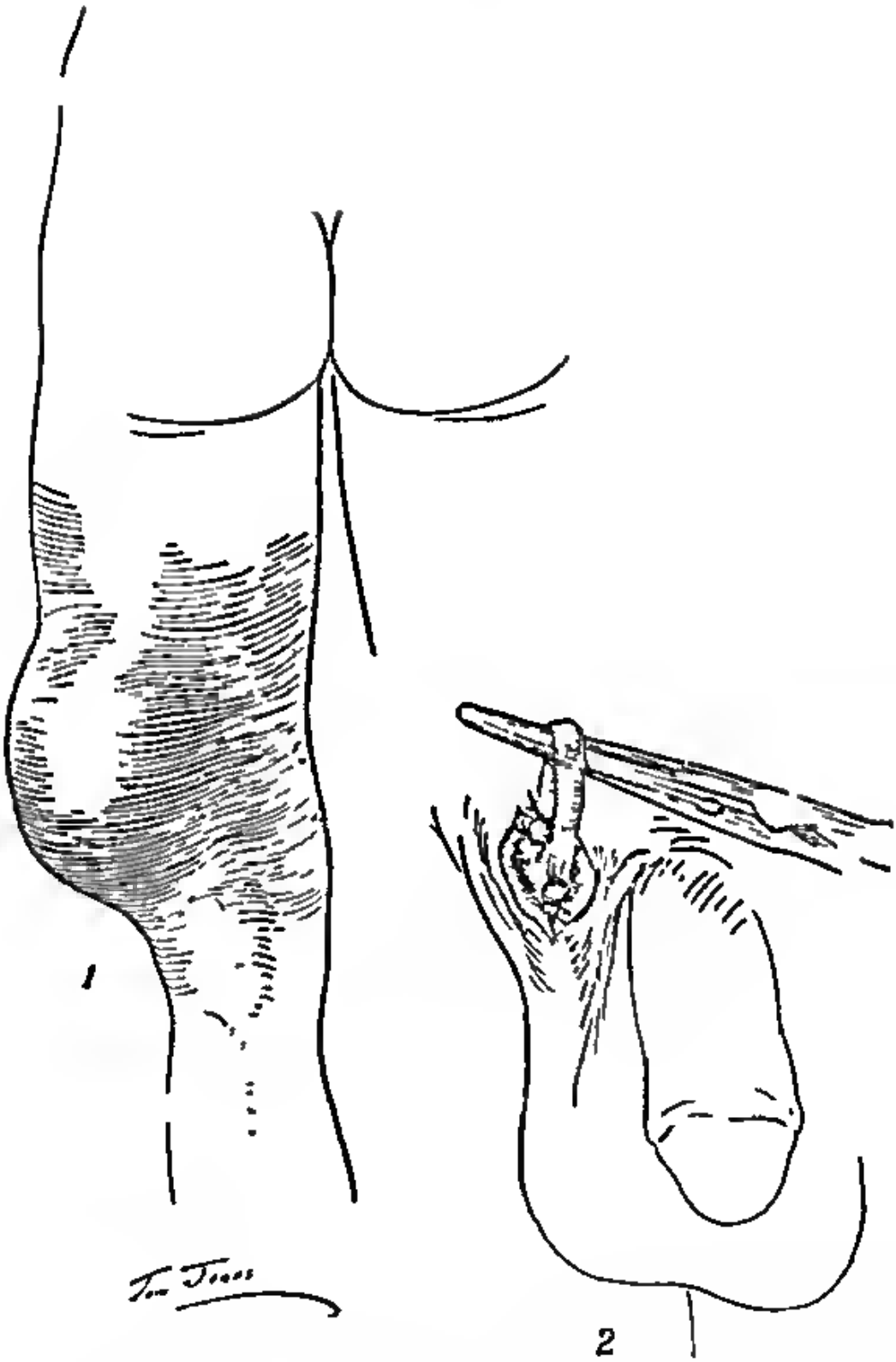

Fig 8—1 Appearance of tumor before the first operation 2 Vas deferens doubly ligated at each end preparatory to its removal Note small incision over external abdominal ring through which the operation is performed

not be distressed in any way by it, and I believe this is a very proper operation to perform

Many years ago I think about eighteen or nineteen, I suggested that the operation of section and permanent occlusion of the vas be used in the treatment of habitual criminals, epileptics, and imbeciles and since that time a number of states have passed laws for the purpose of carrying out this operation in such cases The argument in favor of this particular operation is that the individual is not exposed to any pain neither is there any danger to his life, while the community is protected by the limitation of the procreative powers of habitual criminals, epileptics, and imbeciles

This pain has persisted for some time and it has seemed that his request for the removal of the vasa deferentia was reasonable because it is likely that he will get relief from the pain I have not made out a definite cause for the pain although as you see here the vas is enlarged and has nodules on it It is quite likely that when we come to examine the vas microscopically we will find it is filled with tumor masses The patient s mentality is such that there will be no sociologic loss in the destruction of the vasa deferentia If these masses in the vas are sarcomatous it is certain that there are wide-spread metastases elsewhere particularly in the lungs and that therefore the operation which I am about to perform will be palliative in the very narrowest sense However if it will relieve this patient from pain and possibly prevent the birth of more degenerates into the world it will be worth while

The operation consists in a little vertical incision 3 cm in length with its upper end opposite the external abdominal ring The incision extends through the skin and superficial fascia and fat down to the tissues of the cord You see the vessels of the spermatic cord By grasping these vessels between your finger

their functional capacity Then the vas is exposed freed from the surrounding tissues the entire distance down to the testicle

seminal vesicles Here again it is caught with forceps ligated and cut and the distal end is permitted to slip into the wound The superficial fascia is brought together by means of a few fine catgut sutures and the skin is sutured over (Fig 8 2)

Now I hope this will relieve the patient from his pain. There will be no harm to the patient at all by this procedure He will

CLINIC OF DR ALBERT E HALSTEAD

St Luke's Hospital

MENINGEAL CYSTS

Summary Demonstration of patient with huge meningocele of traumatic origin, varieties of meningeal cysts—their characteristics symptoms treatment—transplantation of fat and fascia probably most efficient

Meningeal cysts may be considered under two general heads (1) Those that are found at autopsy, which during life have produced no symptoms These are of obscure origin, probably the result of birth trauma or of some early infection of a mild type The occasional presence of blood pigment in the cyst wall or in the fluid content of the cyst indicates a traumatic origin (2) Those cysts which are known to follow definite trauma These develop later in life The relation of the cyst to trauma varies in individual cases In some, symptoms pointing to the presence of a cyst may be deferred for months or years after the injury has been sustained This latter group are known as *traumatic meningeal cysts* They are also known by other names—*e g*, hygroma of dura mater (Virchow), meningitis sursa circumscripta cystica

When traumatic cysts follow close upon a trauma the mode of origin is easy to determine There generally are found within the cyst cavity evidences of a recent hemorrhage As a result of the effusion of blood the membranes have become separated (pial cysts) When the cavity has gradually been freed of the effused blood by a process of absorption of its cellular elements there remains a fluid which is identical with blood serum, containing as before said either a few blood cells or blood pigment

In older cysts or those in which a considerable quiescent interval has elapsed between the injury and the formation of the

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MENINGEAL CYSTS

Summary Demonstration of patient with huge meningocele of traumatic origin varieties of meningeal cysts—their characteristics symptoms treatment—transplantation of fat and fascia probably most efficient.

Meningeal cysts may be considered under two general heads (1) Those that are found at autopsy, which during life have produced no symptoms These are of obscure origin, probably the result of birth trauma or of some early infection of a mild type The occasional presence of blood pigment in the cyst wall or in the fluid content of the cyst indicates a traumatic origin (2) Those cysts which are known to follow definite trauma These develop later in life The relation of the cyst to trauma varies in individual cases In some symptoms pointing to the presence of a cyst may be deferred for months or years after the injury has been sustained This latter group are known as *traumatic meningeal cysts* They are also known by other names—*e g*, hygroma of dura mater (Virchow), meningitis sursa circumscripta cystica

When traumatic cysts follow close upon a trauma the mode of origin is easy to determine There generally are found within the cyst cavity evidences of a recent hemorrhage As a result of the effusion of blood the membranes have become separated (pial cysts) When the cavity has gradually been freed of the effused blood by a process of absorption of its cellular elements there remains a fluid which is identical with blood-serum, containing as before said either a few blood cells or blood pigment

In older cysts or those in which a considerable quiescent interval has elapsed between the injury and the formation of the

Past History—Usual childhood diseases Very severe head aches

Venereal History—Denied

Family History—Father and mother dead Knows nothing of family They are in Russia Wife alive and well No children

Habits—Has smoked cigarettes heavily Alcoholic liquors freely Bowels regular Urination normal Appetite good Sleeps well

Physical Examination—*General*—Patient is a well nourished and well built white man of forty-six years His color is good and he has the general appearance of good health

Fig 9—Patient before operation Note huge tumor in occipital region as described in text

Head and Neck—Coming off of the upper occipital region of the head is a tumor the size of an ordinary toy balloon half inflated It is covered with a thin covering of short hair and shows the scar of a former incision The tumor mass is soft fluctuates as if the contents were mostly liquid The mass is about 16 inches in circumference at the junction with the surface of the head It is painful to pressure and is painful to cold sensations (Fig 9) He sees nothing strong light is not even perceived The pupils are slightly irregular and unequal

cyst, the mode of origin is more difficult to explain The presence of a low-grade inflammatory process closing off a limited portion of the subdural or epidural space is probably an important factor Into these closed spaces resulting from an inflammatory adhesion of the membranes an exudate takes place probably from the perivascular lymph-spaces which remain open

In old cysts, where this inflammatory process has been active for a long time the cyst wall becomes greatly thickened The rigidity which results unfavorably influences the prognosis after operation

The case I now present probably belongs to the group of traumatic cysts The history is incomplete because of the inability of the patient to tell in logical sequence the events which lead up to what we now find

The surgeon who operated upon him five years ago makes the statement, in a recent letter to me that nothing was found at the time of the operation. Puncture of the lateral ventricle was performed No satisfactory explanation of why this was done was given nor was any information gained by this procedure

The history of this case is as follows

History —*Complaint* —Hernia cerebri over occipital region Blindness Deafness in left ear

History of Onset —About five years ago patient states he was troubled with severe headaches which were always constant. The headache was located over both temporal areas The patient then went to a doctor who advised a decompression operation This was done and shortly after the operation a small swelling began to form at the point of decompression. This swelling gradually increased in size Swelling started six months after the operation About a month after the swelling started his eyes began to trouble him and gradually he noticed that he was getting blind. Left eye was troubled first Patient

he has a marked pulsation in mass and feels as if it is going to break

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They react sluggishly to light Long exposure to light causes a constriction He is totally deaf in the left ear Hearing is good in the right There is a marked lateral nystagmus in both eyes the quick component being directed to the right There is no cervical or occipital adenopathy The throat is negative Teeth are loose and are badly infected The breath is foul

Chest—The heart tones are pure boundaries are normal No rales or areas of consolidation detected in the lungs Lung excursion is normal

Abdomen—There are no points of tenderness in the abdomen No scars of operations No hernæ are present No tympany

Genitalia—Negative

Extremities—The arms are normal Legs are the site of numerous old scars over the lateral sides of the tibiæ Scars are of paper thinness and are deeply pigmented No tender areas over the tibiæ

Lymphatics—No adenopathy in epitrochlear axillary inguinal or cervical regions

Nervous—Reflexes are all present and normal except pupillary as mentioned Babinski sign is absent

Examination of Eye grounds—Report secondary optic atrophy (Probably secondary to an optic neuritis) Both eyes Vision Has no perception of light in either eye (Condensed light)

Examination made by J R Smith M D November 13 1917

Serologic Reports

Spinal fluid November 13 1917 (preoperative) Cells per cmm 2

Globulin tests

Ross Jones positive

Pandy positive

Wassermann Blood negative Spinal fluid negative

Diagnosis—Hernia cerebri Meningocele

This patient has been prepared for operation and we will proceed immediately to explore and if possible to correct the glaring deformity with which he is afflicted

Operation —The entire head was painted with full strength iodin and then washed with alcohol An incision was made through the skin over the large tumor and the bleeding controlled by forceps The dura was then opened and a clear fluid allowed to flow out in small amounts at short intervals After the fluid was all out the incision in the dura was made larger and the flaps turned over the head A large opening in the right occipito parietal region of the skull was found This was 2 inches wide and about 6 inches deep (Fig 10) This cyst cavity occupied a

Fig 10 —Photograph of cyst cavity exposed at operation

position between the temporosphenoidal lobe and the parietal bone The inner (median) wall was formed by the pia covering the temporo phenoidal lobe The outer wall was formed by the arachnoid and dura The lining of the cyst presented a glistening white mother-of pearl appearance The fluid content was clear limpid fluid The quantity obtained was 27 ounces—about one third of the contents of the cyst was lost After removing by excision the extracranial portion of the cyst wall the thin lining membrane was removed from the greater part of the intracranial cyst cavity This cavity was then filled by a

transplant of fat to which was attached a piece of fascia lata the size of the dural defect (2½ x 3 inches) The fascial transplant was united by interrupted sutures to the edges of the dura surrounding the opening into the cyst The redundant parts of the scalp were excised The scalp wound was closed by catgut and silkworm gut sutures

Meningeal cysts may be either epidural or subdural (pial cysts) Those that are congenital or develop early in life and that have produced no symptoms are mostly pial cysts

The cyst cavity varies in size and shape They are rarely spherical mostly flattened or ovoid The brain underneath the cyst wall is compressed or flattened In *extradural cysts* the dura is depressed and is covered with a yellowish or gray pseudomembrane which forms the cyst wall In *intradural cysts* the dura forms the external wall of the cyst The lining membrane varies greatly in appearance in different cases In the one just exhibited it is glistening white exceedingly delicate and resembles closely the attenuated shining white membrane found lining certain epithelial cysts In other cases it has been described as

(1) Thick and cicatricial

(2) Milky white

(3) It may contain small cysts which give a sago-like appearance to the interior of the cyst cavity

(4) It may contain bone deposits

Microscopic examination of the cyst wall usually shows it to be made up of parallel and concentric fibers of connective tissue with hematoidin crystal embedded within There is usually some granulation tissue and a few fat areas The vascularity depend upon its age The older ones are poor in blood vessels Lymphatic supply in the pial or subdural cysts is limited to the perivascular connective tissue In the cases described in which neuroglia has been found as an important element a neoplastic origin may be assumed Beneath the cyst wall the brain is compressed indurated and sclerotic in some cases

In one case autopsy some time after operation showed thrombosis of the sylvian veins with softening of the frontoparietal

lobe In long standing cases the brain does not expand after drainage of the cyst The final results in the treatment depend largely on the local changes in the brain found at the time of the operation Inability of the brain to resume its normal contour by expansion increases the chances of the cyst cavity refilling

The character of the fluid varies greatly It may be serous, limpid or cloudy Cases are described in which it was milky in character, others hemorrhagic or containing blood pigment in varying quantities giving it a brownish or yellow appearance In one case it resembled olive oil Bone splinters have been found in those occurring in compound fractures of the skull

Symptoms —In traumatic meningeal cysts the symptoms are those of brain tumor As in the case now before you head ache followed by loss of vision were the only symptoms presented Symptoms of cortical irritation may develop early or late In one case treated in this clinic two years ago Jacksonian epilepsy began four years after a compound depressed fracture of the parietal bone the result of a kick by a horse

In general two groups may be described in dealing with the symptomatology of meningeal cysts

(1) Severe nervous symptoms may appear immediately or soon after the accident convulsions paralyses prolonged coma delirium and focal symptoms depending upon the site of injury In the cases recorded these symptoms have developed as early as the first week or have been delayed for six months

(2) In the second group the symptoms following the acci dent may be insignificant or absent These may be only those that could be attributed to slight concussions—*e g* vertigo headache vomiting etc Later months or years afterward serious symptoms may first become manifest Headache choked disk vomiting with focal symptoms including Jacksonian epilepsy may develop

The early development of focal symptoms leads to early operation and in this way gives a more favorable prognosis than when the symptoms are delayed

In recorded cases we find that the duration of the quiescent period has been as long as eight years

Surgical Treatment.—The procedure that is to be employed depends largely upon the *character* of the cyst wall and the location of the cyst, particularly its relation to large blood vessels In epidural cysts removal of the overlying bone, excision of the dural membrane forming the inner wall of the cavity with a fascial transplant to fill the defect left in the dura, is the ideal procedure The cranial defect may or may not be closed. In the majority of cases, when no active inflammatory process is found, there is no probability of a hernia cerebri following Unsightly depressions due to larger defects in the skull may be closed by bone transplant or by any of the other well-established methods of closing these defects As a general rule the skull defects should be closed some time after the primary operation for removal of the cyst wall and closure of the dural defect.

In subdural cysts the success of the operation depends largely upon excision of a considerable part of the cyst wall and of filling the cavity with some substance that will close the cavity temporarily, allowing the brain to gradually regain its normal contour, thus permanently obliterating the cavity

The most satisfactory method appears to be that employed in this case, viz , to fill the cavity with a transplant of fat with sufficient fascia attached to close the defect in the dura This fat, which is obtained from the thigh, is gradually absorbed, the brain expands as this absorption progresses and the cure is permanent.

Of the other methods which have been employed I may mention (1) *Puncture* which is almost always followed by refilling of the cyst, (2) *puncture and drainage* which if the cyst is recent, may effect a cure In older cysts an essential feature of the operation, if a cure is to be expected is excision of the cyst wall.

CLINIC OF DR ARTHUR DEAN BEVAN

PRESBYTERIAN HOSPITAL

A CASE OF CHOLEDOCHOPLASTY AND THE DEMONSTRATION OF AN OVERLOOKED COMMON DUCT STONE

Summary A patient who was operated upon for stricture of the common duct about six months previously now returns to the clinic because of the recurrence of symptoms of obstruction

Operation—necessity for wide exposure reconstruction of duct—utilization of omentum and a rubber tube cessation of the secretion of bile into bile-ducts as result of increased intrahepatic pressure

An overlooked common duct stone recovered at the postmortem examination which had caused two mistakes in diagnosis two operations and the death of the patient

November 14, 1917

I DESIRE to devote our clinic this morning to a discussion of one of the rarer problems and one of the most difficult problems that presents itself in connection with gall stone disease, namely, the reconstruction of the common duct Although this chapter in the surgery of the bile tracts is one that has been but recently written, enough careful work has been devoted to a sufficient number of cases, operated upon by various methods, to enable us to speak with some authority about the surgical technic that has been demonstrated to be of the most value

The patient[1] upon whom we shall operate this morning is a woman of about forty who was operated upon a year ago by a very competent surgeon for gall stone disease At the time of the operation gall stones were found in the gall bladder, but none in either the cystic or common ducts She had had a rather typical history of repeated attacks of gall stone colic never

[1] This case was presented in the SURGICAL CLINICS OF CHICAGO in June 1917 (p 553) by Dr D B Phemister

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associated with jaundice or with any symptoms that pointed to any obstruction of the common duct At the time of operation, because of the extensive disease of the gall bladder it was thought best to do a cholecystectomy This was done with some difficulty on account of the adhesions and at the close of the operation when the surgeon was ligating the cystic artery a severe hemorrhage occurred which was difficult to control Finally this was controlled by crushing in a pair of forceps a considerable piece of tissue which contained the vessel and this considerable piece of tissue was ligated *en masse*

In about forty-eight hours the patient developed symptoms of common duct obstruction as shown clearly by the development of jaundice The surgeon felt that he had probably injured the common or hepatic duct with the ligature or with the clamp and after the development of the jaundice he sent the patient to the operating room opened the laparotomy wound and sought for the ligature which had been used in controlling the hemorrhage divided this and removed it in the hope that the removal of this ligature would remove the obstruction to the common duct At that time it seemed that the part of the common duct grasped by the ligature had lost its blood-supply and would probably slough Within a few days bile poured out of the external wound and the woman went on to a fairly good operative recovery

The biliary fistula persisted for months and finally another operation was proposed—the restoring of the continuity of the common duct At this operation a T shaped tube was used the ends of the divided duct were found and the cross piece of the tube introduced into the hepatic duct above and down into

a tube through the common duct into the duodenum but was not able to do this as the tube would not pass through the con

stricted papilla I think this may be an important point for consideration After the removal of the T shaped tube the jaundice returned intermittently and finally became persistent, and she was referred to me for treatment

The facts in the case seem to be so clear that we are undertaking the operation with more knowledge than one frequently has in these reconstruction cases I have thought over the case a good deal and shall attempt to reconstruct the common duct by introducing a tube into the hepatic duct carrying it into the duodenum after dividing the structures which hinder its entrance and attempt to form a new canal with an omental or fascial plastic

The patient has been anesthetized with drop ether and we shall proceed to the operation I make as you see a very large S incision a little internal to the two scars of the former operations (Fig 11 1) It is very desirable to make a wide exposure in operations of this kind As I open the peritoneal cavity I find that the omentum is adherent to the liver stomach and duodenum I shall proceed very carefully to separate these adhesions Here I find an adherent piece of omentum that I cannot separate I clamp and divide it and ligate both ends Here is another mass of omentum that must be handled in the same way I shall be very patient and take my time to separate these adhesions and expose the structures completely and if possible, without injury to any of the viscera You see it has taken at least twenty minutes to accomplish this Now I have freely exposed the duodenum stomach and liver and I introduce my finger into the foramen of Winslow I feel between my thumb and finger the right free fold of the gastrohepatic omentum, which I know should contain the common duct The gall bladder has been removed in the previous operation With a pair of dissecting forceps without teeth I am now freeing this right free fold of the gastrohepatic omentum from the little fat which covers it and I expose a tube which I think is the common duct (Fig 11 1) To make sure I shall introduce a hypodermic needle into it and I draw out a little mucus but no bile I am now dividing this tube which is the common duct parallel with

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its long axis I put some fine steel clamps on the edges of the incision and expose to view the interior of the common duct (Fig 11, 2) Now with a probe introduced through this incision I try to find an opening into the upper part of the common duct or into the hepatic duct I try first a small probe but I cannot succeed in passing this I am now trying a filiform bougie such as we use in urethral stricture and I cannot pass this I have asked the nurse to sterilize for me the fine eye probes that are used in strictures of the lacrimal duct and taking the finest of these and using a very slight amount of force I find that I can pass it upward through the stricture into the hepatic duct Taking the larger eye probe I pass this and using this as a guide I am now dividing the stricture with a knife The stricture is about $\frac{1}{3}$ inch long and as I enter the hepatic duct you can see a large amount of clear glycerin like mucus pouring out into the wound It is perfectly clear like glycerin It contains no bile and I am very much surprised to find this condition Evidently the liver is not secreting any bile at this time and has ceased to secrete bile because of the great intrahepatic pressure produced by the stricture The condition is clearly parallel to one of suppression of urine in the kidney from ligating off the ureter or from what happens not infrequently a complete obstruction of the ureter from a ureteral stone As I say I have never seen this condition present though I can readily explain the exact reason for its occurrence

I have now opened the hepatic duct fairly widely and find it is dilated above the point of stricture Now I take a No 12 catheter and try to pass it through the common duct into the duodenum but I am not able to do this It is absolutely necessary to do this if we are to succeed in restoring the common duct I am now trying to pass the probe and as you see I can pass a moderate size probe through the common duct into the duodenum I follow this up with a pair of curved artery forceps closed and very gently push the forceps through the common duct into the duodenum I now open the blades of the forceps and stretch the opening at the edge so that I can now pass the No 12 catheter without difficulty I cannot help but feel that this is an im

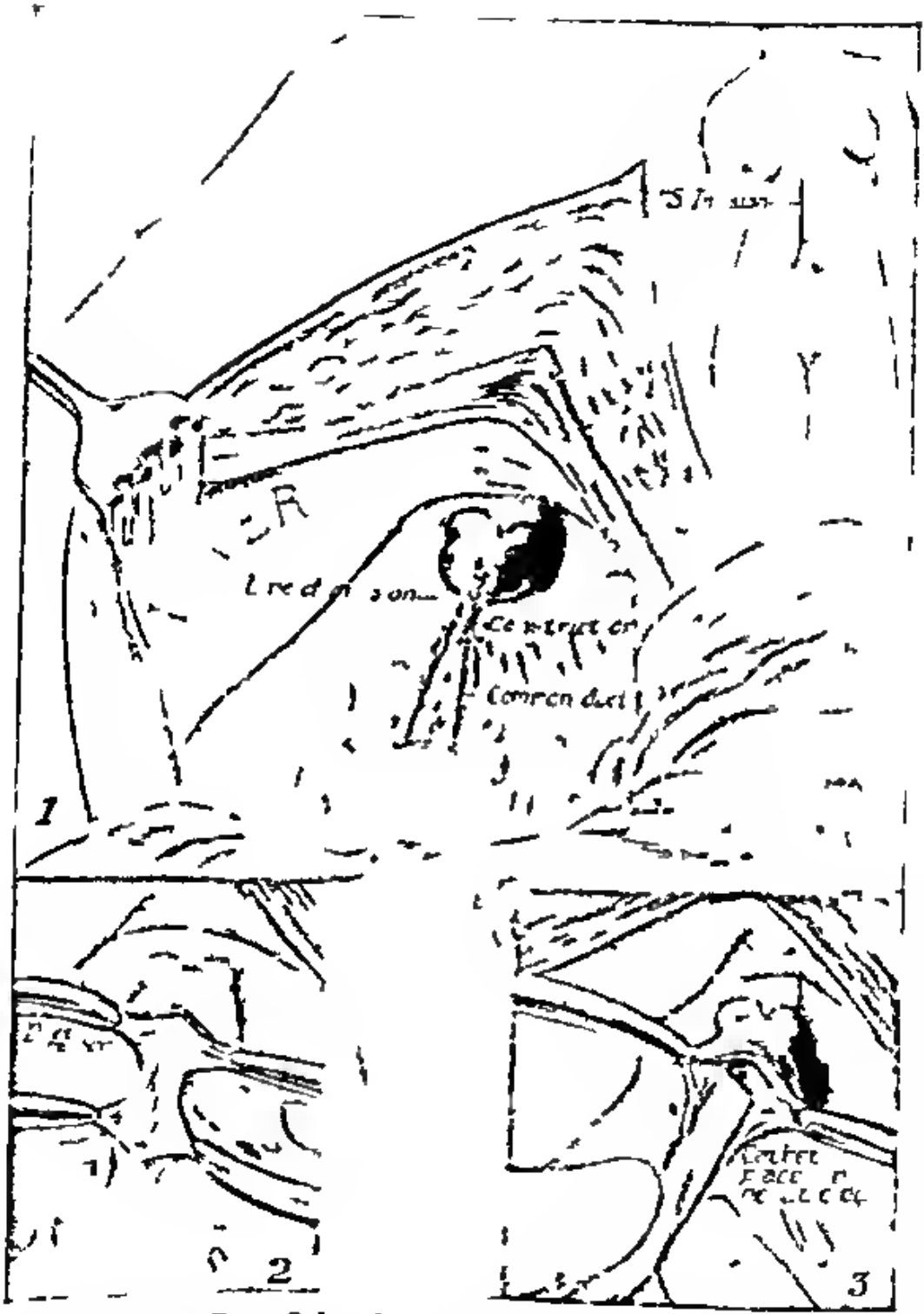

Fig. 11.—The Bevan S-shaped incision, its course on the abdominal wall and the exposure permitted by it in the present case; note the dilated common and hepatic ducts also the size of stricture. 2 and 3, stricture incised and rubber tube (catheter) inserted into upper end of common duct.

duct over the catheter (Fig 12 1), but for a considerable distance, at the point of stricture, it is impossible to do this I shall cover this defect in the common duct with a piece of omentum Fortunately, I can use here the omentum that was adherent to the liver, and I carry this up over the common duct and stitch it in position (Fig 12, 2) I shall now close the external wound in the usual manner with drainage down to the point of operation with two moderate size cigarette drains

The problem which confronted us in this case was to form a permanent canal of fair caliber to take the place of the ½ inch or more of common duct that had been destroyed My conception of the best way to do this is to follow just the technic that we have adopted in this case that is to try to establish a canal between the remnants of the common duct at the point of stricture by means of the rubber tube and the omental flap I shall draw on the board a transverse section of what I hope will happen in this case You see here at the point of stricture a small remnant of the common duct through which we passed the lacrimal duct probe and which was sufficient to form but a very small part of the circumference of the canal to be established at this point Then here is a cross section of the catheter, and in front of this and surrounding the catheter is the large omental flap (Fig 12 3) If the tube will remain in position for a sufficient length of time granulation tissue will form from the remnants of the common duct and from the omental flap around this tube, and then *from both* the hepatic duct and the common duct epithelial cells will grow from the mucous membrane over this granulation tissue and eventually form a connective-tissue canal lined with epithelium I shall be glad if the tube remains for from six weeks to three months and during that period I shall expect that a permanent canal lined with epithelium will be produced I hope and believe that the tube, there being about 6 inches of it in the duodenum will find its way into the duodenum and be passed

For cases of this kind after a rather careful search of the literature on the subject this appeals to me as being the operation of choice In some cases the direct implantation of the

portant step in the operation To ensure an easy escape of bile into the duodenum I carry one end of the catheter up into the hepatic duct for about ½ inch and stitch it to the outer edge of the hepatic duct with two fine linen sutures (Fig 11, 3) I

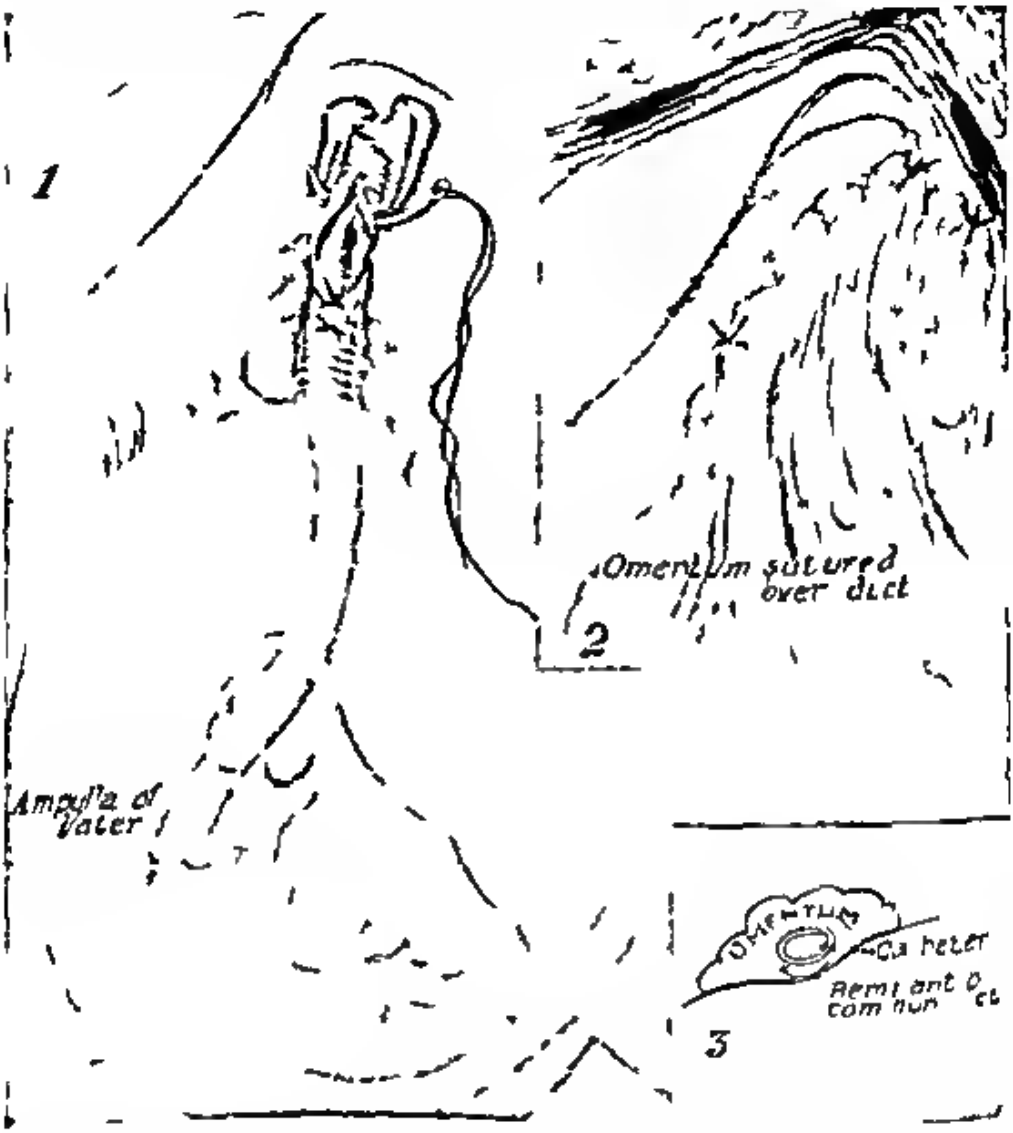

Fig 12—1 Tube carried through the distal portion of common duct and through the ampulla of Vater into duodenum 2 Omentum sutured over defect in common duct 3 Diagrammatic cross-section of the point of stricture at the completion of the operation

then carry the other end of the catheter through the lower part of the common duct into the duodenum and leave about 5 or 6 inches of the length of the catheter in the duodenum, and then with some chromic gut close part of the incision of the common

could come down even to the location of the common duct Then we opened into an abscess containing pus and small irregular flakes of material that looked like cholesterol The patient was in such bad condition that we simply drained the abscess She had been suffering for weeks from a profound cholemia,

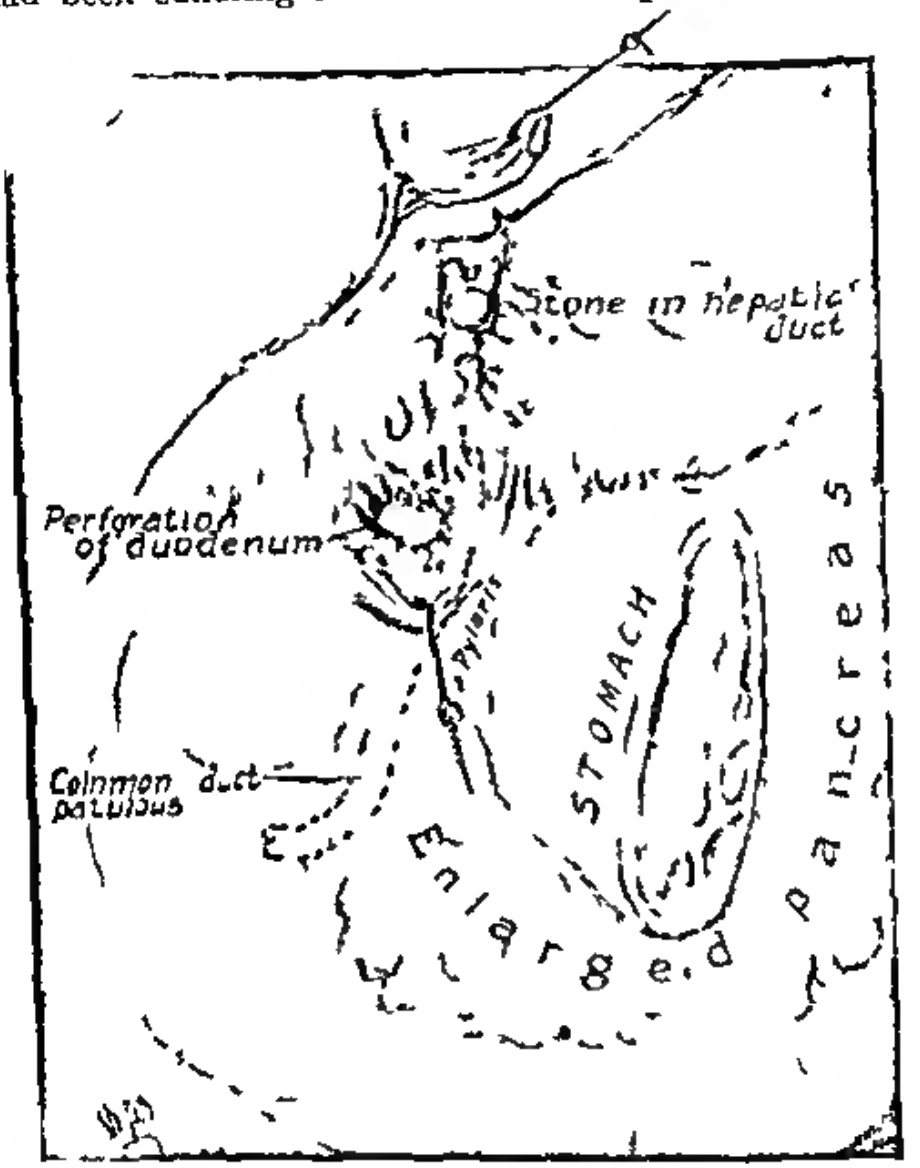

Fig. 12.—Drawing of region of bile-ducts made at postmortem. The overlooked stone in the hepatic duct in a reasonably accessible location was the cause of the death of this patient. The defect in the duodenum probably represents the point at which the Sullivan tube had been carried into the duodenum in the operation for the supposedly dilated common duct.

and finally died from the cholemia and the development of a duodenal fistula about three weeks after the operation.

A very interesting condition of affairs was found at the postmortem. An opening was found in the duodenum probably at the point where the surgeon had made the anastomosis between

hepatic duct or upper patulous part of the common duct into the duodenum can be made, and where that has been possible it has given excellent results.

Postscript—The patient went on to a very satisfactory operative recovery The bile drained externally along the cigarette drains for about two weeks and when these were removed ceased within a few days and after this the external wound closed very promptly The jaundice rapidly disappeared The patient improved in weight and strength *x* Ray pictures taken at the end of four weeks show the tube still in position.

AN OVERLOOKED COMMON DUCT STONE

I now want to show you a postmortem specimen removed recently from a case of obstruction to the common duct where an attempt had been made by one of our best abdominal surgeons to reconstruct the duct, and where later I made an exploratory operation for the same purpose, but found conditions such as to make it impossible to do any operation on the duct itself This specimen was obtained from a woman who died on my service a few weeks ago The history was that a cholecystectomy had been done several years ago for gall stone disease This was followed later by the development of jaundice, a jaundice which was at first intermittent and finally became persistent She was taken to a surgeon of large experience in this work, who made a direct anastomosis between the hepatic duct and the duodenum but without relief Later on analyzing the condition it was thought that she was suffering not from an obstruction of the duct, but from some lesion involving the entire parenchyma of the liver—some form of cirrhosis. Later she was brought to Dr Sippy's service After studying the case with a great deal of care he came to the conclusion that it was not a general disease of the liver but that the jaundice was due to an obstruction of the common duct and asked me to operate on the case

At the time of operation we found very dense adhesions all about the liver and stomach duodenum transverse colon and omentum, which required fully an hour to separate before we

GALL-STONE ILEUS

Summary A patient with symptoms of intestinal obstruction of three days' duration exploratory laparotomy under novocain and discovery of large gall stone in lower ileum remarks on gall stone ileus

THE first case which I shall operate upon this morning is a woman of about sixty who was brought into the hospital last night suffering from what appears to be an attack of intestinal obstruction from some unknown cause and as yet I have not been able to determine the anatomic location Three days ago she was attacked with pain and vomiting and she has a very slight temperature The leukocyte count is about 12,000 She has pain of a very moderate degree at the present time and is but very little distended Her abdomen is not rigid She continues to vomit The attending physician who brought her here, found it was impossible to secure either with enemas or cathartics any bowel movements We have been unable to locate anything in the large intestine in the way of a carcinoma Rectal examination fails to disclose anything in the rectum or the pelvis

She gives an old history of previous abdominal attacks years ago, which may or may not have been gall stone attacks The history is rather vague, and simply that years ago she had for a period repeated abdominal attacks lasting for a few hours There is no history of an appendiceal lesion or of anything wrong with the uterine appendages

After studying the case carefully I am unable to arrive at a definite diagnosis I believe however, that she has some obstruction and that the wise thing is to make an exploratory operation and determine the cause of the obstruction and to remove this if it is then found She is very weak and not a good subject for a general anesthetic I shall therefore because she complains of more tenderness in the left lower quadrant make a muscle splitting incision in that position under local anesthesia

the duct and the duodenum The common duct was patulous throughout There was no stricture and no carcinoma but at the junction of the right and left hepatic ducts and blocking up the beginning of the common duct entirely was a small stone which you see in this specimen (Fig 12A)

There is a moral which I should like to draw from these two cases and that is first the importance of doing cholecystectomies with very free wide incisions so that the cystic duct and cystic artery can be completely exposed when they are ligated without carrying any risk of injury to the hepatic or common duct Many of these cases where restoration of the common duct becomes necessary are cases in which with a wider exposure and a little more care injury during cholecystectomy could have been avoided In the second place as illustrated by the specimen which I show you in all cholecystectomies we should examine the common duct and hepatic duct for stones and where these are found they should be removed at the same sitting Of course it is impossible even in the hands of the greatest expert to avoid leaving stones sometimes in the hepatic or common duct and I am rather inclined to think that in the specimen which I have shown you the stone is so small and situated so high up that it was practically impossible for the surgeon to discover it at the time of the operation At the same time it is possible that with a small scoop it might have been removed if one had in mind the possibility of the existence of such a condition I think one should where the common duct is open make it a rule to pass a probe from the incision in the common duct into the duodenum and then up through the hepatic duct and to attempt at any rate to determine the existence of stones If these are found of course their removal with proper scoops is as a rule possible

Reconstruction of the common duct for carcinoma has had a very narrow field We seldom if ever find a carcinoma of the common duct so small that it can be resected and the patient cured As a rule in these cases the operation is necessarily palliative and should be either a cholecystenterotomy where this is possible or a cholecystotomy where there is difficulty and the condition of the patient does not warrant prolonged operation

including the stone This prevents the escape of any intestinal contents I wall off the field very thoroughly with several abdominal pads and make an incision in the intestinal wall parallel with its long axis and exactly opposite the mesentery. This incision is about 1 inch in length, and you see that I can now without difficulty push the stone out through the incision and palpate it.

Examination shows that it is a single large stone without any facets. It has a number of small projections on its surface about

Fig 13—Gall stone ileus Note dilatation of bowel above point of obstruction.

the size of grains of wheat (Fig 14, *b*), giving it a sort of mottled appearance It evidently was formed as a single large calculus in the gall-bladder

I now close the incision in the intestinal wall by two rows of sutures (Fig 14, *c*) and drop the loop of intestine back into the abdominal cavity We close the incision in the usual way, just as we would an appendix incision, leaving, however, a cigarette drain passing through the center down into the peritoneal cavity.

I am infiltrating now the line of incision with ½ of 1 per cent novocain in sterile water to which we have added about 1 100 000 adrenalin solution You will notice that the first injection is made with a fine needle and a small hypodermic syringe such as is ordinarily used for morphin This is followed with a larger needle and a large syringe and I shall not hesitate to employ 3 or 4 ounces of this solution in infiltrating the abdominal wall I now make an incision about 6 inches long on the left side just as we would make an ordinary oblique muscle-splitting incision for an appendix operation on the right The skin and superficial fascia are divided and the external oblique exposed This is infiltrated with some more of the novocain solution The external oblique is now divided exposing the internal oblique which is infiltrated again with novocain The fibers of the internal oblique and transversalis are now separated and the peritoneum exposed I now infiltrate the pentoneum with a fine syringe I want to call your attention to the importance of this step because the parietal pentoneum is very sensitive and the mistake is not infrequently made in doing laparotomies under local anesthesia of not anesthetizing the parietal pentoneum separately before incising it I now divide the peritoneum and a large distended bowel comes into view I examine this and find it is a greatly distended coil of small intestine I now wet my gloved hand so that it will slip more readily through the incision and into the abdominal cavity I very gently palpate the structures within the abdominal cavity and I at once come down to a hard firm mass that feels about the size of an English walnut This seems to be quite movable I very gently draw it out through the incision and as I bring it into view you can see that I have a coil of small intestine in my hand and between my

gall stone which has blocked up the intestine producing a picture of obturation ileus

I bring this coil of intestine into view and place an intestinal clamp (Fig 14 *a*) upon a coil of intestine about 5 inches long

including the stone. This prevents the escape of any intestinal contents I wall off the field very thoroughly with several abdominal pads and make an incision in the intestinal wall parallel with its long axis and exactly opposite the mesentery. This incision is about 1 inch in length, and you see that I can now without difficulty push the stone out through the incision and palpate it.

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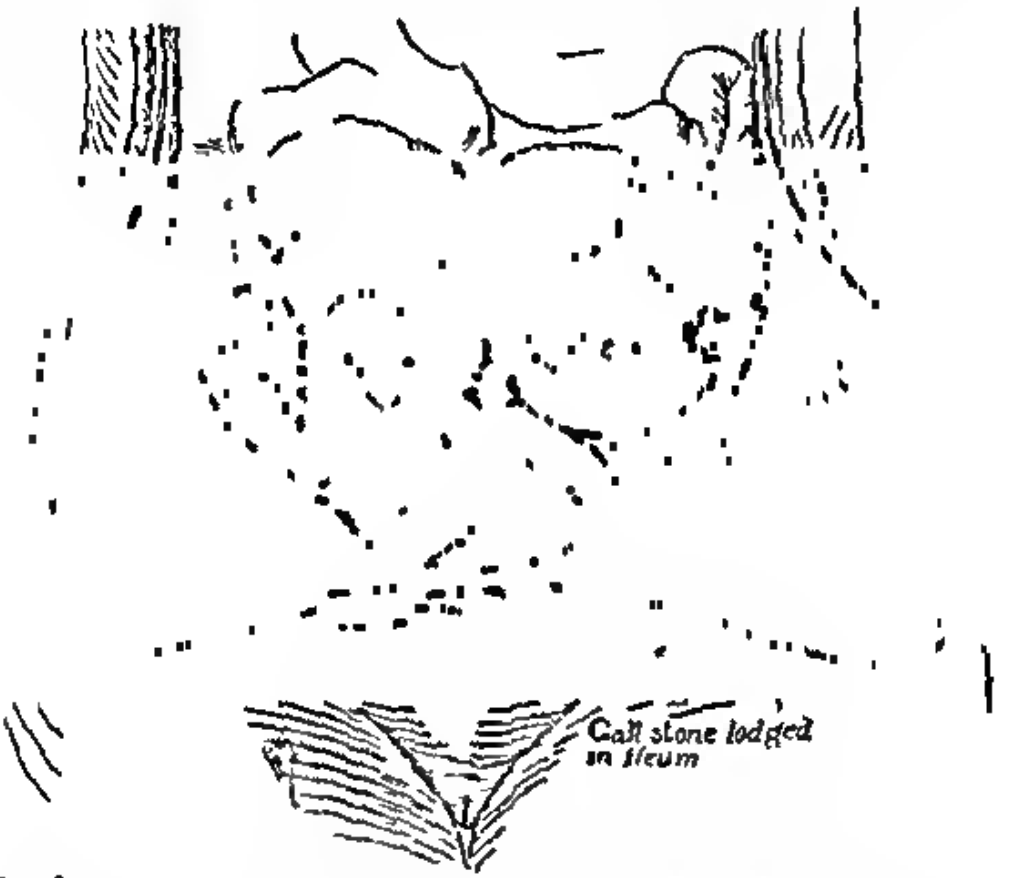

Fig. 13.—Gall-stone ileus Note dilatation of bowel above point of obstruction.

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I would like to take the opportunity of saying a word or two about these cases. I have seen a half-dozen or more similar cases of obturation ileus produced by gall-stones. The history of the course of events is this: A large gall-stone forms in the gall-bladder, as large as this one or sometimes larger, and sometimes without very acute previous attacks; usually, however,

Fig. 14.—Removal of gall-stone causing the obstruction. Incision in bowel closed by two layers of sutures.

with a history covering a number of years of gall-stone colic attacks. Sometimes, however, with acute symptoms and sometimes with very slight or no symptoms the gall-bladder becomes attached to the duodenum or to the transverse colon and sometimes to the stomach, but this is rare, and by pressure-necrosis the gall-stone ulcerates its way from the gall-bladder into one of these hollow viscera, the process evidently being a gradual one and

requiring some time I have been fortunate enough to find in two instances that the stone in the gall bladder ulcerated its way into the duodenum, so that it was partly in the duodenum and partly in the gall bladder Eventually the stone passes into the viscus If it passes into the transverse colon it invariably is passed per rectum without any difficulty If, on the other hand, it ulcerates into the stomach or ulcerates into the duodenum, it passes along the small intestine for a short distance, depending upon the size of the stone You will remember that the duodenum and jejunum are of much larger caliber than the ileum and there is a gradual diminution in size of the small intestine from the duodenum down to the ileocecal valve As the gall stone is carried along by the peristalsis of the small intestine, if it is of sufficient size it eventually reaches a point in the small intestine, which is gradually diminishing in size where it becomes arrested and produces obstruction The obstruction is of a pure obtura tion type, that is at first simply obstructing the caliber of the small intestine without producing interference with its circulation The symptoms of obturation are, as a rule of moderate degree as compared with those of strangulation ileus If the picture persists the patient may die from toxemia and the absorption of the toxins developed in the obstructed bowel above the gall stone or general peritonitis may develop and be the immediate cause of death Where the condition is recognized of course operation and removal is as a rule simple, is very clearly indi cated, and gives an excellent prospect of cure

This form of gall stone ileus with its definite mechanical cause is but one of the forms of ileus that can be produced by gall stone disease We have had a number of cases of paralytic ileus associated with gall stone disease where local peritonitis or ex tensive peritonitis around the gall bladder produced paralysis of the intestine with the resulting picture of ileus As a rule these cases pass on to recovery, but sometimes the paralytic ileus is persistent and fatal

RUPTURED EXTRA UTERINE PREGNANCY—CONFUSION WITH APPENDICITIS

THE next case which I shall show you is a young woman of about thirty and very stout She must weigh 240 pounds She comes to us with an acute abdominal attack coming on forty-eight hours ago without much temperature great pain so severe that the patient had to go to bed at once some vomiting and distinct tenderness over the region of the appendix She has been married for six years and has never been pregnant There is no history of any pelvic disorder and I am rather inclined to regard the case as acute appendicitis although I think we should take into consideration the possibility of an involvement of the right uterine appendage

Under general anesthesia I shall make a muscle splitting incision over the appendix I am doing the usual muscle split ting method You notice however because of the great thickness of the abdominal wall the edges being 3 or 4 inches thick that it is necessary for me to make a very long incision 6 or 7 inches in length I now open the peritoneal cavity and rather to my surprise the first thing that comes into view is free blood The blood evidently is not very fresh because there are some clots in it and it must have been poured out into the peritoneal cavity twenty four or forty eight hours ago Before going any farther I want to say that this changes my view of the case and I am inclined to think now either of an extra uterine pregnancy or a hemorrhage from a ruptured graafian follicle associated with an ordinary menstrual period but without an extra uterine pregnancy We have had several of these cases where women have been brought here with acute abdominal pain where we have thought either of an appendix or an extra uterine pregnancy and have found on operation an ounce or sometimes several ounces of blood in the peritoneal cavity around a ruptured graafian follicle As I pass my hand down into the

BENIGN STRICTURE OF RECTUM—TREATMENT BY DILATATION UNDER ANESTHESIA AND TRANSPLANTATION OF MUCOUS MEMBRANE

THE next case which I shall show you is a case of benign stricture of the rectum This is a case that has been under medical management for some time Bougies have been used, but it has been difficult to keep the stricture open, and the patient has suffered a good deal in general health because the bowels have not moved regularly One of the chief complaints has been symptoms of intestinal toxemia because of the failure to have regular and complete bowel movements The stricture is very short I have just examined it and find it extends only about 2 inches up the bowel, and apparently beyond that point there is either the normal caliber or even the dilated caliber of the rectum

I have planned out for this case a procedure which is new and which, it seems, will fit the indications and probably permanently cure the condition I wish you would follow me carefully as I do this operation and I shall attempt to make the details of the procedure clear My purpose is to dilate very fully and widely the rectum at the point of stricture, and then to free the mucous membrane of the dilated rectum above the point of stricture for an inch or more, and bring it down and unite it to the margin of the anus, very much as one would do a Whitehead operation, except that no mucous membrane will be removed I shall dilate the stricture with this small rectal speculum and then with a large rectal speculum (Fig 16 *a* and *b*) As I dilate the stricture very fully with this large rectal speculum the mucous membrane at the site of the stricture ruptures, exposing a raw surface uncovered by mucous membrane about 1½ inches in width, extending from the mucous membrane of the dilated bowel above the stricture to the anus I now bring the mucous membrane of the dilated bowel above the stricture down with the forceps, and then with mattress sutures of black linen I sew

this mucous membrane to the margin of the anus (Fig 16 *c d*) It is rather interesting to note what a small amount of mucous

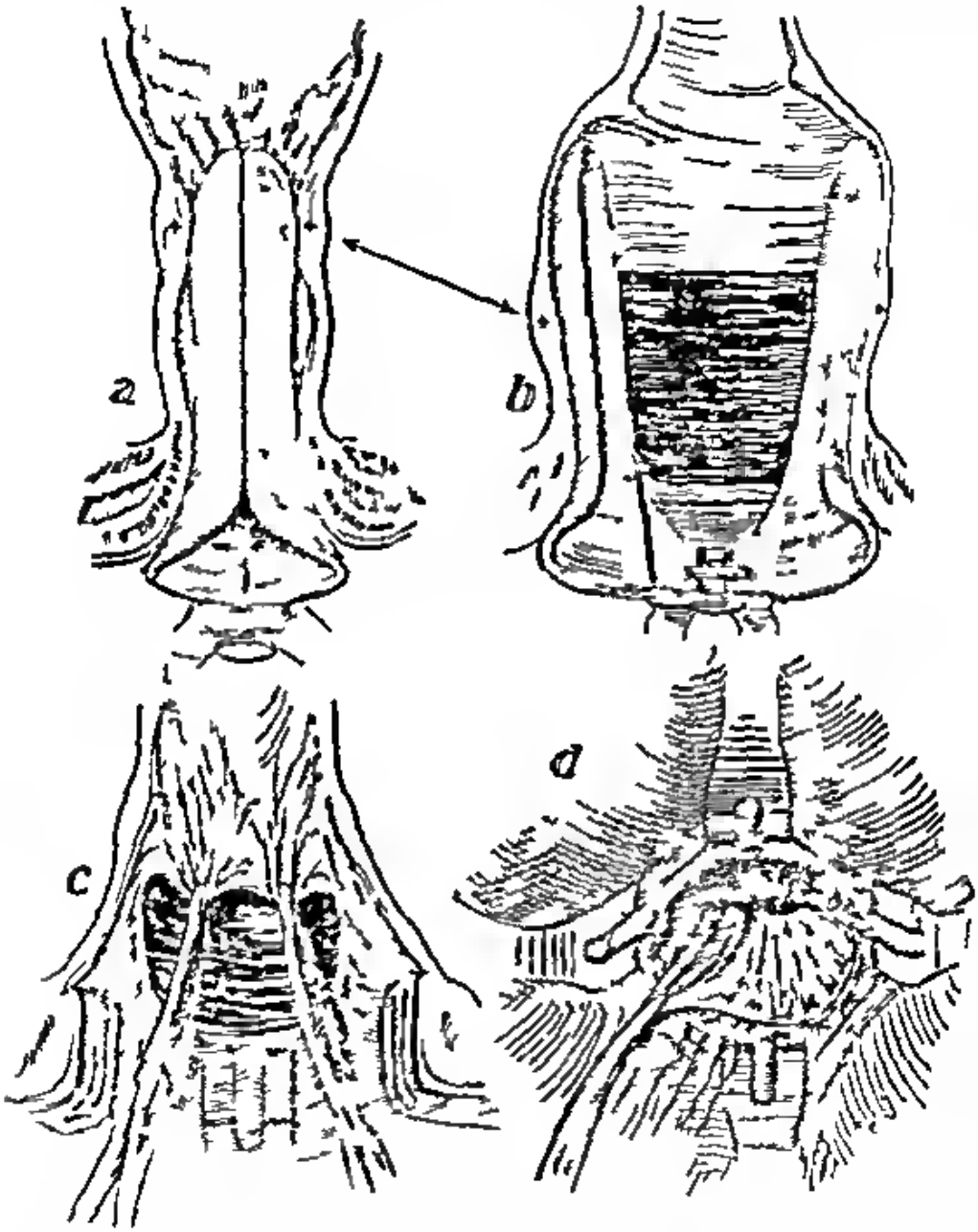

Fig 16—Benign stricture of rectum. *a* Site of stricture *b* Dilatation of stricture—shaded area represents rent in mucous membrane incident to the dilatation. *c* and *d* Pulling mucous membrane down and stitching it in position to cover denuded area

membrane sufficed to cover the stricture It remains anteriorly on the rectum, and it has been necessary for me to cover the pos-

terior three-fourths of the circumference with my new mucous membrane flap You will see that the rectum now has a large caliber at the point of previous stricture

I am inclined to believe that this operation has a very distinct field Of course necessarily a narrow one as the field would be limited to cases where the stricture is short and where you can bring the mucous membrane of the comparatively normal bowel down to the anal margin

It will not be necessary to remove these short black linen sutures as they will come away themselves in eight or ten days I believe however it will be desirable to pass a rectal speculum gently into the anus and dilate it moderately every two or three days during the closing days of wound healing beginning let us say at the end of the week until wound healing is complete

Postscript—The result in this case seemed to be admirable I believe however that here as in all these rectal cases the case should not be lost sight of but should be kept under careful observation for a considerable period and moderate gentle dilatation with the speculum carried out to ensure against subsequent stricture

CLINIC OF DR L L McARTHUR

St Luke's Hospital

(Surgical Congress of North America, October 24, 1917)

OPERATIVE CLINIC DEMONSTRATING PRACTICAL POINTS IN CONNECTION WITH NEPHRECTOMY AND RESECTION OF THE COLON

Summary Case I A patient with severe persistent hematuria, not influenced by medical measures and a history of repeated attacks of renal colic with passage of stones per urethra the probable diagnosis reasons for suspecting neoplasm, nephrectomy

Case II Carcinoma of the hepatic flexure of the colon producing obstruction with increased intra intestinal pressure and rupture of a Meckel's diverticulum, first operation Ileocolostomy with resection of diverticulum convalescence complicated by fecal fistula Second operation Resection of terminal ileum and fecal fistula together with large intestine up to and including hepatic flexure with tumor

One cannot refrain from expressing the appreciation and honor that one feels in having the celebrated men of the world come to this humble clinic I must call your attention to the fact that we have Sir Berkeley Moynihan, Col T H Goodwin, the representative surgeon of the British Army, and Col Dercle, representing the French medical service here this morning

Case I —The patient, a married man of sixty four years, has complained of hematuria for the past few weeks He first noticed urinary symptoms four years ago, when he had backache and pain in the region of the bladder This was relieved after passing some small stones from the urethra Since then he has had five similar attacks The latter part of April, 1917, he noticed that the urine contained blood It became more bloody during June and July This was not accompanied by

pain Since April he has been losing weight and becoming gradually weaker

Past History—Usual diseases of childhood smallpox at seven, pleurisy at fifty six

Family History—His wife and six children are living and well Father died at the age of eighty-one

Habits—Uses tobacco moderately and alcohol very moderately

DR McARTHUR You have heard the history The patient is a phlegmatic German weighing about 200 pounds His anemic condition was so pronounced when admitted that I did not dare submit him to any operative risk His hemoglobin was down to 36 per cent. and his red corpuscles to 1 900 000 After about three weeks of rest in bed medication and tonics we have improved conditions so that blood examination now reveals 48 per cent hemoglobin and 3 200 000 red cells In the *x* ray plate an outline of the left kidney is to be seen there is a distinct shadow There is a history of having had five ureteral colics and having passed small stones Naturally the conclusion is that he has a stone in the kidney but the anemia is so pronounced and the hematuria so persistent that I cannot free my mind of the idea that he has a hypernephroma and that this kidney will have to be extirpated The shadow showing in the *x* ray plate is low—in the lower pole of the kidney—and it is not as frank as stones in the kidney usually are A persistent flow of blood from stones in the kidney when the patient is absolutely at rest is not in my experience a common thing The kidney is rather tender on palpation Though the patient is very big and fat and difficult to palpate yet I think there is some enlargement of the kidney as well as tenderness of it It is not a case that one would pick out for clinical demonstration The operation is going to be a difficult task It would not surprise me if at the operation or soon after he would die but we cannot check this hemorrhage by any known medication and there is nothing left but surgical interference

The cystoscopic examination made last evening shows normal urine coming from the right ureter and almost pure bright red

blood from the left The blood was coming so freely that the washings of the bladder could hardly be made clear enough to utilize the cystoscope

Operation (*Oblique Lumbar Incision*) —The fatty capsule around the kidney is found to be infiltrated and very firmly attached to the kidney With the kidney exposed we find conditions very suggestive of malignancy The organ feels rather soft and fluctuating The question is whether we should remove such a kidney without delay or incise it for the purpose of exploration first I have the rest of the kidney out of its capsule, after considerable effort and find the lower pole to be soft and fluctuating but presenting as does the rest of the kidney the appearance of a possible malignancy On palpation I do not locate any stone but when the kidney is collapsed I may be able to Good judgment must be shown here in determining whether we should attempt to save this kidney by drainage or not Mr Moynihan is of the opinion that if it is left in it will probably have to come out later That is my impression also With the kidney removed I split it open and you see what is on the inside The lower pole of the kidney is disintegrated and has stones in it—a number of small stones I am convinced that the suggestion of Mr Moynihan is good that this would be a surgical kidney always It does not look like a simple involvement of the portion of the kidney which contains the stones but as if there were a papillomatous or carcinomatous growth there also

Experience has taught me that the procedure of ligating the pedicle of a kidney should be most thorough Be sure that you have the pedicle well encircled before taking off the forceps. For that reason I have taken a longer time to do this step of the operation than probably seems justified In this particular case the patient being extremely anemic I am more desirous than usual that there shall be no secondary bleeding There is still a little oozing at the pedicle which I do not feel justified in leaving

In these very stout patients you have to make a transverse or almost transverse incision by which you cut all three of the

abdominal muscles As you know, you have to cut in such a fashion that you will not injure the ilohypogastric and ilo-inguinal nerves as they come down in an oblique direction in the abdominal wall. We now insert a drainage-tube and close the wound in the usual way

Pathologist's Report—"Papillocarcinoma of kidney spreading from pelvis."

CASE II.—We have for our next patient a doctor who for two or three years has suffered with periods of intense vomiting preceded by symptoms of intestinal obstruction. When he gets his bowels to move he would be all right. He entered St. Luke's in May with intestinal obstruction. The vomiting was fecal in character I advised him at that time to have surgical interference, first trying to repeat his experiences of washing out the colon and getting him back into a semi-normal condition so that we might ascertain the location of his intestinal obstruction. We were fortunate enough working the first night—he came in before midnight—in finally getting a bowel movement before morning thus getting him into shape so that we could make an x-ray investigation of his intestinal tract. We found a stricture at the hepatic flexure of the colon. After two or three days' colonic washings he was better, with the tenderness however always at the hepatic flexure of the colon. After studying the x-ray plates we decided that his trouble was in all probability, a neoplastic obstruction not an adhesive obstruction from an inflamed gall bladder which was his diagnosis because he had had pain immediately beneath his gall bladder for two or three years. He decided that he would not be operated on and went home

Two or three weeks ago he came back with a high temperature a leukocyte count of 22 000 and an acute obstruction. One day prior to admission when stooping over he felt something give way in the abdomen. He stayed home suffering a great deal of pain for forty-eight hours with a high temperature and all the evidences of a peritonitis and later came to the hospital in that condition—a peritonitis associated with what we knew to be an obstruction of the hepatic flexure of the colon The

only thing we could do would be to open the abdomen and endeavor to relieve the obstruction

On opening the abdomen we found not only the ascending colon greatly dilated, but a loop of ileum at least 12 or 16 inches long was also dilated quite as large as the colon which it paralleled It extended so far we had to go 18 or 20 inches back on the ileum in order to make an anastomosis between the transverse colon and ileum When opening the abdomen we found plastic lymph pus, and all the evidences of an acute recent inflammation in the zone reaching from the umbilicus to the midportion of this dilated 16 inches of ileum which gave us the impression of a Meckel's diverticulum that apparently, under the backward pressure due to the obstruction had ruptured and made this inflammatory process We resected this zone, closed the hole in the distended ileum with purse string sutures, and inverted it with a Lembert suture On the seventh or eighth day after the operation a fecal fistula developed though the bowels had immediately begun to move through the short circuit route

There remains now this situation The anastomosis of the ileum and transverse colon, a carcinoma of the hepatic flexure of the colon a septic process and a fecal fistula at the point at which this diverticulum—probably a Meckel's diverticulum—was located I feel that had he entered at the time we urged him he would probably have escaped both the septic process and the fecal fistula and probably would have been relieved of his carcinoma

On questioning him as to any trouble with his umbilical region he said that his mother told him that as a child or rather when he was born there was the greatest trouble experienced in the care of his umbilicus There was something wrong with his navel that lasted into his second or third year His mother is dead, so we cannot get any definite information but I rather think he had one of those persistent ducts which make a true Meckel's diverticulum

I will have to reopen the field making an effort to be as cleanly as possible septic as it is We must give the patient one chance

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Pathologist's Report.—"Papillocarcinoma of kidney springing from pelvis."

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for his life I hope that the anastomosis which we have made for him will enable us also to follow this bowel which was enormously distended at the time of the operation The inflammatory trouble as you know produced an adhesion to the anterior abdominal wall and we had great difficulty at the time in separating it from the umbilical area I am slowly dissecting loose the adhesions of the ileum and ascending colon from the anterior abdominal wall I must reach the caput coli and see if I can begin to extirpate I have now exposed the posterior wall. There is an abscess leading down beyond the caput coli. I pack off that sinus Now I am loosening up the omentum that is plastered around the ascending colon and dilated ileum. I have to get it out of my way I have the remains of the diverticulum of the ileum which I am removing I have ligated it and will now bury the end by putting a purse-string around it I am trying to reach the line of junction between the transverse and ascending colon so that I may determine where I can incise the bowel and start extirpation

The statistics carefully worked out by the Germans have shown that omental amputation has a definite mortality If during an operation—hernia for example—you have to ligate off a very considerable mass of omentum the mortality of that operation is increased 40 per cent I told you that at the former operation I made an anastomosis between the ileum and the transverse colon I find now that I have reached that point. We will have to amputate the bowel at that position turn in the ends of both limbs and then excise the abdominal tumor I now apply the intestinal clamp on the proximal side of the anastomosis in order to prevent further fecal staining of the field I separate the peritoneum from the lateral abdominal wall so I can mobilize the colon inward In this step one must be cautious about the ureter

At the time of the first operation we found a very distended appendix At that time I spoke of the desirability of making a safety valve at the appendix but unfortunately did not do so Had I done so I am quite sure we could have relieved all the tension in that loop and prevented the fecal fistula That

was my error in judgment The tumor mass is still to be felt It is not unusually large One tries to save as much of the parietal peritoneum as one can otherwise an extensive raw surface is left on the abdominal wall for the small intestine to become plastered to the adhesions which may result are a serious thing in the convalescence

Here is the fistula It did not occur at the anastomosis It occurred at the point where the diverticulum had ruptured Whether this was a congenital diverticulum or not is not determined I am leaving probably more of the mesentery than ordinarily because that will make a good covering for the posterior abdominal wall Ordinarily this segment of bowel with its mesentery would be taken out by a V incision but I want to preserve more of the mesentery to act as a covering for the denuded abdominal wall and I therefore divide the mesentery at the mesenteric border of the intestine The entire loop of bowel which has been side-tracked at the first operation is now removed You see this includes the terminal 14 inches of ileum the cecum ascending colon hepatic flexure with the carcinoma and a portion of the transverse colon I close the abdomen in layers making provision for abundant drainage

Postscript—Patient is making a good but slow recovery Pathologist reports carcinoma of colon annular in character January 28 1918 patient reports himself well

for his life I hope that the anastomosis which we have made for him will enable us also to follow this bowel which was enormously distended at the time of the operation. The inflammatory trouble as you know produced an adhesion to the anterior abdominal wall and we had great difficulty at the time in separating it from the umbilical area I am slowly dissecting loose the adhesions of the ileum and ascending colon from the anterior abdominal wall I must reach the caput coli and see if I can begin to extirpate I have now exposed the posterior wall There is an abscess leading down beyond the caput coli. I pack off that sinus Now I am loosening up the omentum that is plastered around the ascending colon and dilated ileum. I have to get it out of my way I have the remains of the diverticulum of the ileum which I am removing I have ligated it and will now bury the end by putting a purse-string around it I am trying to reach the line of junction between the transverse and ascending colon so that I may determine where I can incise the bowel and start extirpation

The statistics carefully worked out by the Germans have shown that omental amputation has a definite mortality If during an operation—hernia for example—you have to ligate off a very considerable mass of omentum the mortality of that operation is increased 40 per cent I told you that at the former operation I made an anastomosis between the ileum and the transverse colon. I find now that I have reached that point We will have to amputate the bowel at that position turn in the ends of both limbs and then excise the abdominal tumor I now apply the intestinal clamp on the proximal side of the anastomosis in order to prevent further fecal staining of the field I separate the peritoneum from the lateral abdominal wall so I can mobilize the colon inward In this step one must be cautious about the ureter

At the time of the first operation we found a very distended appendix At that time I spoke of the desirability of making a safety valve at the appendix but unfortunately did not do so Had I done so I am quite sure we could have relieved all the tension in that loop and prevented the fecal fistula That

MAJOR KELLOGG SPEED

A CLINICAL TALK GIVEN AT NO ———[1], BRITISH EXPEDITIONARY FORCE, ——[1], SEPTEMBER 25, 1917, SECOND IN THE REGULAR SERIES OF MEETINGS OF THE MEDICAL OFFICERS OF THE BRITISH ARMY IN THIS DISTRICT

GUNSHOTS OF THE HEAD, WITH ESPECIAL REFERENCE TO INDICATIONS FOR OPERATION AND TECHNIC. DEMONSTRATION OF CASES

Summary Choice of the anesthetic—superiority of general anesthesia with ether a simple classification of gunshots of the head (*a*) Non penetrating, skull damage acknowledged (*b*) penetrating brain mechanical pathology—shock, hemorrhage trauma, foreign bodies bacteriologic pathology—usually secondary, operation with opening of dura questionable in absence of decisive intracranial symptoms gutter wounds—frequent scattering of inner table of skull with but slight damage to outer table the tumbling bullet treatment of foreign bodies—how bacteria are carried into brain

OUR commanding officer, Colonel ———, has very kindly asked me to address you at the regular meeting of our district when it comes the turn of our station to act as host For that international courtesy, as an American, I am greatly obliged, because every American considers it his greatest and most sacred privilege to talk

Since the inauguration of these quasiclinical meetings a week ago it has been hoped that each medical officer would take up—either as an independent speaker or in discussion—points of intense interest to him, which look toward refinements of the service Undoubtedly we are very fortunate in being attached to this group of clearing stations toward which is directed the steady stream of head injuries and if we fail to improve technic, pathologic knowledge and our interpretation of clinical findings we are falling short of our full duty

[1] Deleted by censor

us because bacterial action has not yet entered as a factor The factors which *are* present and which must be considered are

(*a*) Shock—concussion

(*b*) Hemorrhage—of any degree, with special reference to its effect on intracranial pressure

(*c*) Mechanical injury of vital portions of the brain and tissues about or remote from the missile track

(*d*) Presence or absence of foreign bodies—as metal bone, cloth, etc

In looking back on my month's experience here it seems to me that not enough emphasis is laid on Sir Victor Horsley's work done in 1908 covering the mechanical damage to brain tissue from gunshots Reference will be made to that later

Assuming then, for convenience, the division into mechanical pathology, which concerns us so largely in these primary wounds under discussion and the bacteriologic pathology which is secondary, let us return to the question of immediate operative interference There is no desire to make an exact definition of indications, merely one to bring out discussion of various points illuminated by our individual experiences Let us refer to Major Cushing's statement of last week—that after excising scalp wounds and removing depressed or damaged bone, we should proceed to open the dura when subdural hemorrhage or cortical contusion is suspected, even though that membrane be intact Should we do this in operative work in the face of gunshot wounds and latent infection? I believe not Although I have performed this step many times, washing out clots and searching with a director, closing the dura afterward, and for the most part, have obtained very happy results it does not seem necessary

Moreover on the other hand during a rush of work last year at the time of the Somme push many instances of head injuries came into my wards on which there was not time to operate, and after balancing up statistics some weeks later I found that the mortality among unoperated patients even in many where scalp incisions were not practised and where foreign bodies lay in the brain was decidedly lower That was partly explained by the fact that only the most severe lacerated wounds were oper-

Indication for operation and technic are my interests Today I wish to ask you something about operative indications referring to technic only incidentally in so far as it is intermingled with the other Perhaps we all agree on operative investigation of every gunshot wound of the head Every one recognizes that a scalp wound may cover serious pathology, and as war surgeons it is our duty to excise early all soiled and tousled wounds of battle regardless of location. Whether these scalp wounds, where penetration is uncertain and roentgenogram is negative should first be investigated by excision under a local anesthetic is a point for each man to decide for himself Personally I believe in the general anesthetic. The patient is put to sleep, in a few seconds the scalp wound can be excised, and if there is no skull damage or indication for skull opening the anesthetic is stopped, and before all stitches are in the patient is regaining consciousness and the anesthetist has moved on to the next table When local anesthesia is used time is consumed waiting for its effect, if further operative steps are needed the field must be disarranged to permit the anesthetist to step in so that technic is interfered with and valuable time of the operator is lost In the rush work of clearing stations each operator's time should be conserved as much as possible because that means more wounds subjected to early treatment with consequent better prognosis

Taking a very broad viewpoint in the subject of operative indication, let me refer you to a simple classification in head gunshots

(*a*) Non penetrating—of the dura and brain—skull damage acknowledged.

(*b*) Penetrating brain

Our basis for operation must be after all a pathologic one

A working pathologic analysis of war wounds of the head may be divided thus

(1) Mechanical pathology of gunshots

(2) Bacteriologic pathology usually secondary

(1) Mechanical pathology concerns largely the patients we receive a short time after injury, and is of greater interest to

from gunshot wound That was excised soiled and depressed bone was trimmed away and in absence of dural damage no further operation seemed indicated on the head He had however suffered a contusion of the left flank and presented a bruised area over the left lower ribs with abdominal rigidity on the left side A laparotomy was performed an incomplete rupture of the ileum was sutured and a small tear in the spleen repaired The operation was not long and he was sent to the ward in good condition Death followed in forty eight hours At autopsy the abdomen showed no peritonitis no accumulation of hemorrhage the sutured gut was intact The brain as you see shows no clots beneath the site of fracture which was here in the parietal region but there are small hemorrhagic areas near the midline remote from the wound small in extent with some generalized cortical edema Would temporary opening of the dura have relieved these so far away—because there was every indication to *close* the dura again? If the man died of the head injury would opening of the dura have saved his life? I cannot say but I do believe that no true permanent decompression of the cortex can be accomplished without opening and *leaving open* the dura In war wounds even with wide excision of battered tissues ought we thus leave open the unwounded dura and cover the defect with scalp when we are *never* sure about the sepsis? Under conditions of civil life with an intact clean scalp it is my practice where decompression is indicated to do it either at the site of fracture or in the subtemporal region remote from the fracture at the site of election leaving the dura open and closing the scalp perfectly It would be difficult to say whether an additional decompression in the temporal region would have favorably affected this man s course

Gutter Wounds Causing Skull Fracture —In gutter wounds of the skull may we not add one further point of observational importance? Major Cushing mentioned his surprise at the greater comminution and scattering of the inner table in some instances when the outer table showed small evidence of damage These examples I presume he meant as different from the usual type of depressed fracture where it is commonly understood that

ated on, even those with brain penetration, without urgent symptoms, were put to one side or sent over to England

The investigations of Lieutenant Colonel Warren and his report to the Director General, Sir Alfred Keogh, last year was quite interesting He followed over 1200 patients from France to England and most closely recorded the results in at least 600 of them, concluding that many head operations in France were worse than useless, that a great many patients did better without operation, in that they avoided the great danger of hernia cerebri Ultimate neurologic complications among unoperated patients were found to be surprisingly small

Since 1916 the plan of early surgical procedure accomplished by "team" work, such as we are engaged upon, has come into vogue The results are even more surprising than those given by any non interference methods, I believe, and accord with the experience of the French

In wounds of the skull in which the dura does not seriously lose continuity and the brain is not penetrated may we not expect that subdural clots will be absorbed as blood extravasations are elsewhere in the body? If decisive cranial symptoms are lacking why should we open the dura to wash out these blood collections? Do capillary hemorrhage and cortical edema demand operation—will these conditions not adjust themselves as concussion does? We must remember that the highly organized brain tissues are enclosed in a fairly non-elastic bag of dura—and the whole enclosed in the non yielding skull so that dangers of threatening increase of intracranial pressure must be given relief Nor do we mean to include recognized middle meningeal hemorrhage or patients showing signs of severe brain injury with rising blood pressure a slowing pulse, or other evidence that they are on the verge of physiologic circulatory breakdown and are making all efforts to establish normal circulatory conditions in the offended brain by these accessory pressures Let me repeat that it is in instances of absence of decisive cranial symptoms that dural opening is questionable

Let me show you this brain recently removed The man suffered a slightly depressed fracture in the left parietal region

but results in a broadened full length of the bullet wide track In this instance the tumbling was confirmed by digital examination of the track The great shock of tumbling and transmitted rotatory force lends to the gravity of these wounds Here because of the tumbling of the missile in the semiliquid brain enclosed in its tight jar of skull the immediate pathologic changes

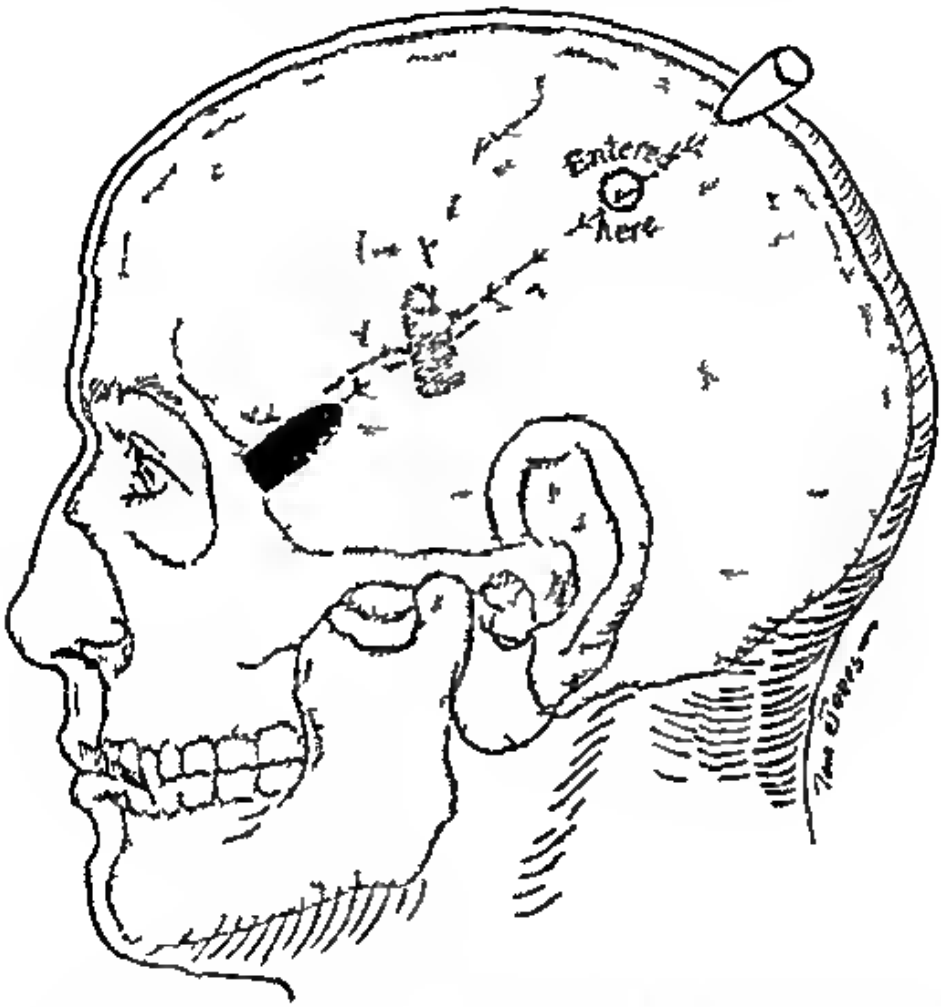

Fig 17—Penetrating bullet wound of brain Entrance wound very small caused by nose of bullet Note reversion of bullet after tumbling in the brain

may not be limited to the track of the bullet as shown in Bashford's findings in the examinations of solid organs as kidney and liver made at the 23d General Hospital last year More remote circulatory changes must be induced by the conveyance of these movements

Clinically then may we not conclude that these patients are

the inner table constantly suffers greater damage We must more carefully consider the cause and mechanism of each wound By that is meant partly the type of missile involved Gutter wounds from shrapnel may not at least theoretically damage the inner table so much because there is lack of rotatory force which is imparted to a bullet by the rifled gun barrel That force in bullet wounds is certainly transmutted to some extent, to the inner table in expanding concentric waves and causes greater destruction of the inner table Should not each helmet and scalp be searched for evidence of shrapnel or bullet injury and operative procedure be partly influenced on that ground shrapnel gutters being of less importance greater destruction and more cortical damage with unthrown bone fragments being anticipated in bullet wounds

Penetrating Gunshots of the Head —Let me show you the roentgenogram of another patient (Fig 17) The bullet entered here in the parietal region and passed down and forward coming to lie just behind the right orbit. You will note that it is reversed, that is the point of the bullet now points exactly backward toward the wound of entrance In other words, the bullet tumbled completely in its passage through the semiliquid brain mass This finding is exactly in accordance with Horsley's experiments and it is an excellent example of bullet tumbling in the brain. You recall that his experiments were performed on skulls containing their brains and the wounds were filled with plaster of Paris which took on the configuration of the wound track. In every penetration where the bullet remained in the skull it tumbles just *once*—no more If the velocity is high enough we may expect a through and through wound but in bullets which are partly spent and are destined to stop within the skull the tumbling occurs. It is correctly and easily explained by the fact that resistance of the lighter nose of the bullet tends to retard it and turn it down The momentum of the heavier and bulkier body behind crowds it forward until it swings in a circle and the heavier end finally comes around to lie in front as the missile travels on. For surgical pathology this has significance because the track made by the bullet is not a simple penetration tunnel

was situated just in front of the torcular and below the straight sinus which my finger could not find to be torn both sinuses being palpated The foreign body was removed and the scalp closed by a plastic operation That was a month ago We may now partly dismiss the fear of bacteriologic pathology but not completely because I have seen these patients go on for ten or twelve weeks and then die of a slowly progressing meningitis especially if hernia cerebri is present He has no hernia although the scalp has partly sloughed away over the bony defect No paralyses are present nor visual disturbance but his mentality is still weak (He left for the Base in good condition six weeks after injury)

Patients do recover from gas infections of the brain—I observed one last year

Judged from the standpoint of retention or thorough removal the question arises as to the relative irritation of intracranial bone and metal fragments Major Cushing referred to this point last week in speaking of the brain's tolerance of foreign bodies He considered that bone fragments caused more irritation intracranially than metal because the latter were of themselves slightly antiseptic On theoretic grounds—and clinical observation favors the conclusion—it seems to me that the well vascularized brain might be supposed to absorb in recovery small bone fragments deprived of their normal blood supply just as bone transplanted and finding no physiologic functional demand is absorbed elsewhere in the human body Probably both metal and bone are fairly negligible as bacteria carriers—rather must we consider the dirty scalp hair cloth and other substances carried in *usually on the metal* Hence we say get the metal All these bodies require irrigation and removal if possible Metal from shells is sterilized by the heat of fire human skull bone is reasonably sterile but the contamination comes from the external human tissues and clothing

in grave condition and should not be subjected to additional shock, as from operation, until they have partially recovered?

In penetrating shrapnel wounds the bone shower into the brain is relatively greater, but the total brain damage is not so great on account of the lack of rotatory motion.

Here are two patients representing mechanical pathology This first one had a through and through wound from one temporal region to the other, rather high up The skull was torn widely open, both hemispheres of the brain were deeply guttered the longitudinal sinus was obliterated The wound was cleaned, irrigated, bone fragments removed, and the trimmed scalp sutured over a drain of paraffin gauze He is conscious has no paralyses, but having seemingly recovered from his mechanical pathology received two days ago, we must now fear the bacteriologic pathology to follow The prognosis is bad. (Patient passed away four days later)

This second man exemplifies a similar type of mechanical pathology with a better prognosis The missile entered here just behind the orbit traversed the front of the skull, and made exit behind the other orbit, fracturing the ethmoid, nasal, and frontal bones, and opening the base of the frontal fossa into which I could pass my finger The brain itself was evidently not lacerated, but I had to remove every trace of ocular tissue all damaged, so that he is blind forever He too has recovered from his mechanical pathology, we now may fear bacteriologic pathology from infection carried through or from contamination from opened nares and orbits But he is draining away well by both nares and orbits (He was sent to the Base two weeks later with normal temperature and every promise of recovery)

Foreign Bodies Within the Brain—Removal.—As a rule may

[illegible]

hind the right ear with penetration of a sizable fragment of shrapnel and with a shower of bone After trimming scalp and bone over a considerable area the index finger could just palpate the shrapnel lying in the occipital lobe about 5 inches deep It

CLINIC OF DR THOMAS J WATKINS

St Luke s Hospital

RADIUM IN GYNECOLOGY—RESULTS WHICH MAKE IT WORTH WHILE

Summary Presentation of 4 pat ents treated by radium Case I F bro d tumor Case II Chron c metritis Case III Submucous uterine fibro d with cancer Case IV Inoperable cancer of body of uterus effects of radium treatment on hemorrhage—its great value as a palliative measure in advanced carcinoma even though a cure may be unhoped for

These cases present different features and show the different effects from radium In two the results were most gratifying in the third they were disappointing, while in the fourth they were of distinct benefit

Case I—Mrs D aged forty married twelve years has an especially interesting history A fibroid tumor was detected with her first pregnancy which took place soon after marriage The uterus was emptied as it seemed inadvisable to permit the pregnancy to continue A second pregnancy occurred and the uterus was again emptied Following this operation I did a vaginal myomectomy and removed sixteen fibroid tumors She has since had two normal labors

On August 25 1917 she consulted me for hemorrhage and examination revealed multiple fibroid tumors which made the uterus about the size of a three months' pregnancy On August 30th 30 mg of radium with 1 mm of brass screening covered by rubber were inserted into the uterine cavity She had very little constitutional disturbance from the radium Twenty six days after the radium insertion a menstruation occurred which lasted three days and was about 50 per cent normal in amount Twenty-eight days later another menstruation occurred which lasted six days normal in amount

Examination showed a uterus that was possibly some smaller than normal for a multipara of her age

The interesting features in this case are

1 Two periods following radium insertion

2 No menstruation for eight months

3 Regular menstruation following

4 The hyperplastic uterus has become normal in size

This case indicates that the action of the radium was probably more pronounced upon the uterine tissue than upon the ovary

CASE III—Mrs B aged seventy two referred by Dr Archibald Church consulted me May 5 1917 She was usually well until one week ago when she had a profuse uterine hemorrhage which has continued Has some colicky pains in the pelvis Menopause occurred at fifty two

Examination revealed a polyp about 3 inches in diameter presenting at the cervix

On May 8th under gas anesthesia an examination was made, and the polyp was found to be very friable and attached by a small pedicle near the fundus The mass was so friable as to be easily removed by clamping the pedicle with an 8 inch forceps which cut through the pedicle The rest of the uterus was entirely free of disease as far as could be determined by touch Frozen section showed a cancer

Radium (50 mg) was left in the uterus for twenty four hours There were no constitutional symptoms from the radium

On July 25th examination revealed a small nodule at the vault of the vagina On the 28th 50 mg of radium were inserted in the vault of the vagina Following this treatment she had severe bladder and rectal pains which lasted for two or three weeks undoubtedly due to the radium She passed a large amount of mucus from the rectum and considerable mucus and pus from the bladder

August 28th examination showed no signs of recurrence The vaginal vault was closed by adhesions Rectal examination showed a very small uterus

September 13th The vaginal vault remains closed There

She was examined November 9th. The uterus was normal in size and I was unable to palpate any tumor She had skipped the last two periods It is not uncommon for one menstrual period to follow the use of radium, but it is unusual to have two periods before cessation of menstruation. This emphasizes the importance of waiting a considerable time before using a second treatment, which will generally be unnecessary The fact that she had two menstruations would be evidence that the radium produced a marked effect upon the endometrium. The effect upon the ovary we would expect to occur earlier

This is the first case I have ever seen where a fibroid tumor entirely disappeared or disappeared beyond ability to palpate from any treatment save operation This patient was one that was very favorable for radium treatment, as the tumor was not large and as the patient was near the age of the menopause, and there were no suspicions of any intra-abdominal complications.

CASE II.—Mrs S, aged forty five, referred to me by Dr G M Glazer She had suffered from uterine hemorrhage for six months and between the periods had a profuse and often bloody discharge and was obliged to wear a napkin continually

Examination revealed a mucous polyp at the cervix and a uterus twice as large as normal The size of the uterus was easily determined as conditions were very favorable for bimanual palpation

Radium (50 mg) screened as in Case I, was inserted on November 13 1916 and left in twenty five hours A preliminary curettage was made to exclude the possibility of malignancy

December 21 1916 she reported that she had had two menstrual periods the first one very severe and the second one moderate in amount.

February 17 1917 No bleeding since December 14 1916 The uterus considerably smaller than when radium was used.

November 15 1917 she reported that since the radium was used she menstruated twice and then menstruation ceased for eight months The last two periods have come at the regular time and were normal in amount.

Stomach resonance on percussion normal Moderate general abdominal distention No free fluid in abdomen The growth in the median line extends up 3 or 4 inches above the pubes

Vaginal Examination—Vaginal portion of cervix short and transverse diameter about twice normal The cervical canal is patent and is about ½ inch in diameter The cervix is indurated but not ulcerated The anteroposterior size of the uterus is from the pubes to the sacrum The growth extends to the bony wall on the right and extends less to the left The uterine appendages are not palpable Conjoined palpation gives an impulse over the uterus for 4 inches above the pubes There is general increased pelvic tenderness The vaginal discharge is purulent, watery and offensive

The diagnosis is cancer of the uterus involving the pelvic peritoneum the right broad ligament and bladder wall The carcinoma probably started in the body and has extended somewhat into the cervix The extensive involvement of the disease makes the case inoperable

Treatment Proposed—There seems to be no hope of cure We propose to use radium as a palliative measure We are very firmly convinced that the palliative treatment of cancer is highly important and has been much neglected in such cases The desperate condition of the patient is a strong appeal for service It is a mistake we believe to take all hope of life away from her as she has lost nearly everything else The palliative treatment is also valuable in such cases to relieve the sorrow and anxiety of the relatives

USE OF RADIUM

April 19 1917 50 mg of radium put into uterus and left for twenty four hours Screened with glass silver brass and rubber No constitutional symptoms resulted from radium

April 28 1917 50 mg of radium screened as before in cervix and fixed by suture

May 7 1917 General condition unchanged

May 10 1917 Vaginal examination Discharge about the same Cervix smaller and more fibrous Does not bleed upon

is a small nodule in the cervix and a small nodule in the left iliac glands

October 12th Both growths have enlarged.

November 10th The growths in the cervix and iliac glands are enlarged so that they make one globular mass 3 or 4 inches in diameter

This case has some interesting features The prognosis seemed to be excellent with the radium on account of the age of the patient and the apparent limitation of the disease to the polyp The rectal and bladder symptoms were probably due to insufficient screening The case is interesting also as notwithstanding the rapid growth of the tumor there has been no recurrence of the bleeding discharge or odor and the superficial wound has remained healed The radium acted satisfactorily superficially but did not destroy the deep growth

CASE IV —This case is presented because positive results have been obtained and because it shows the great power of radium in extensive cancers The history is as follows

April 17 1917 Mrs D aged forty-seven. Weighs 100 pounds One year ago weighed 198 pounds loss in weight apparently due to cancer Family history is negative Previous health good

Present Illness —Dates back six months when constitutional and local symptoms commenced. For three months constant pelvic pain has been present which probably means peritoneal involvement. She has taken x ray treatments which she thinks have not given her any relief or benefit She says that she has become so much weakened that she cannot stand alone and has frequent fainting spells

Menstruations were normal until about January since when she has bled most of the time She has had four pregnancies the last in 1895 She has an offensive vaginal discharge which is constantly bloody She also has increased frequency of urination

Examination by Dr Watkins, April 17, 1917 —*Abdominal* — Increased tenderness over lower part of abdomen Kidney impulse obtained on both sides and both are apparently normal

CLINIC OF DR DANIEL N EISENDRATH

Michael Reese Hospital

VARIETIES OF URETERAL STRICTURES

Summary A patient septic and with a right lumbar pyo-urinary fistula following operation for supposed gall bladder disease demonstration of impermeable ureteral stricture operation—removal of enormously dilated renal pelvis and infected hydronephrotic kidney causes and types of ureteral strictures

I wish to present today a young man twenty nine years of age who entered the hospital yesterday with the following history His present illness began eight years ago when he began to have chills and fever accompanied by pain in the right lumbar region and the appearance of a swelling in this location All of these symptoms would disappear after the use of hot applications During several of these attacks which recurred at irregular intervals he had been seen by physicians who had made a diagnosis of gall bladder trouble He had a sore on his penis nine months ago and has had three injections of salvarsan He has also had four attacks of gonorrhea but without any serious complications that he is aware of Six weeks ago while in another city he had another attack of severe pain in the right upper quadrant of the abdomen A diagnosis of acute cholecystitis was made and the abdomen opened by a transverse incision The painful enlargement which could be distinctly felt just below the right costal arch proved to be a greatly distended kidney This was sutured to the anterior abdominal wall at the posterior end of the incision and a drainage-tube inserted Later examination by the surgeon showed an impermeable stricture of the right ureter in its upper third

The patient since admission to my service has had a marked leukocytosis and a high temperature (105° F) a turbid fluid

examination The patient seems weaker than when she was admitted

May 17, 1917 50 mg of radium inserted into cavity of uterus

May 29, 1917 Vaginal examination shows some adhesive vaginitis

June 4, 1917 Vaginal discharge has entirely stopped She has a fistula between bladder and uterine canal

It seems inadvisable to give more notes from the record The points of special interest in the further history of the case are as follows 1 Cessation of all offensive discharge from this time until the patient died 2 Absence of bleeding subsequent to a few days after the first insertion of radium 3 Cervical wound remained healed 4 The amount of pain was very much lessened and for weeks was controlled with one or two powders daily containing ½ grain of codein and 5 grains of aspirin The patient died August 2d from general exhaustion

Remarks —It is difficult to estimate the value of the radium in a case like this We believe the value of palliative treatment should be emphasized that in the case of cancer the disease is often worse than death both to the patient and the relatives The ability to stop hemorrhage to stop the offensive discharge and to lessen the pain can only be appreciated by those who have been intimately associated with the care of cancer cases

The special interesting features as far as the radium was concerned were that the wound healed and remained healed until the time of her death except for the uterovesical fistula which persisted The relation of the radium to the lessened pain is an interesting subject The decrease in the amount of pain was in all probability largely due to the elimination of most of the infection and consequently the lessening of the amount of round celled infiltration pressure and septic neuritis

CLINIC OF DR DANIEL N EISENDRATH

MICHAEL REESE HOSPITAL

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constantly escapes from the posterior end of a transverse right sided upper abdominal incision. The Wassermann reaction is negative. Radiographic examination of the urinary tract reveals no shadows of calculi Upon cystoscopic examination the right ureteral orifice is seen to be quite prominent and red, but no

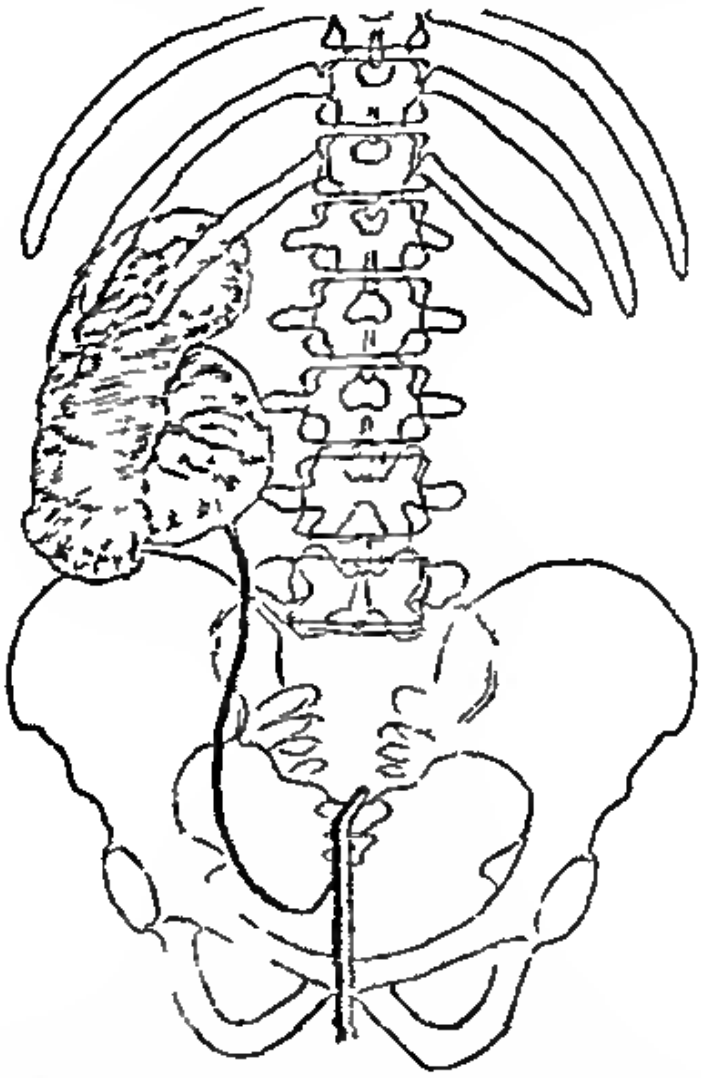

Fig 18.—Hydronephrosis secondary to inflammatory stricture of the right ureter Note x-ray catheter inserted to level of stricture in lumbar portion of ureter

urine is ejected from it No 5 ureteral catheter cannot be passed further upward into the right ureter than to a point correspond

so. It is impossible to fill the ureter above the point of obstruction with fluids like thorium, collargol, or argentide, which we permit to flow by gravity through the ureter in order to obtain information in regard to the degree of dilatation of the ureter or renal pelvis. This is a method of diagnosis known as ureterography or pyelography as the case may be. Although this method is condemned by some as being a very dangerous one, I feel that if we do not employ force to inject the fluid, but permit it to flow in by gravity, it is no more dangerous than a cystoscopy. We have inserted an x-ray catheter to the point of obstruction and taken an x-ray picture of the entire urinary tract. This demonstrates that the stricture in the right ureter is located at the level of the upper border of the fifth lumbar vertebra [illegible] in the lumbar portion of the ureter close to a large shadow which is evidently the much distended renal pelvis and kidney (Fig. 18).

The functional test (phenolsulphonephthalein) and examination of the urine obtained by catheterization of the opposite kidney show that a nephrectomy of the right-sided infected hydronephrotic kidney would be a safe procedure. We shall now proceed to perform a right nephrectomy.

Comments During Operation and Examination of Removed Kidney.—The nephrectomy was a most difficult one owing to the extensive and firm perinephritic adhesions. It was necessary to use the subcapsular method recently advocated by W. J. Mayo (Surgery, Gynecology and Obstetrics, [illegible] January, [illegible]), so that the renal pedicle was isolated without tearing the vessels. There were no accessory arteries or veins at the upper or lower poles. The renal pelvis was tapped, [illegible] with fluid. This portion of the kidney was the size of an orange and was found in the iliac fossa. At its lower end the dilatation ended abruptly. An examination of the removed kidney (Fig. 19) will show, just below this sudden decrease in size of the renal pelvis, was a complete obliteration of the lumen at a point where the lumbar ureter had been converted into a fibrous cord for a distance of 1 inch. The kidney on section and from its surface shows an advanced infection in the shape of multiple miliary [illegible]

constantly escapes from the posterior end of a transverse right sided upper abdominal incision The Wassermann reaction is negative Radiographic examination of the urinary tract reveals no shadows of calculi Upon cystoscopic examination the right ureteral orifice is seen to be quite prominent and red but no

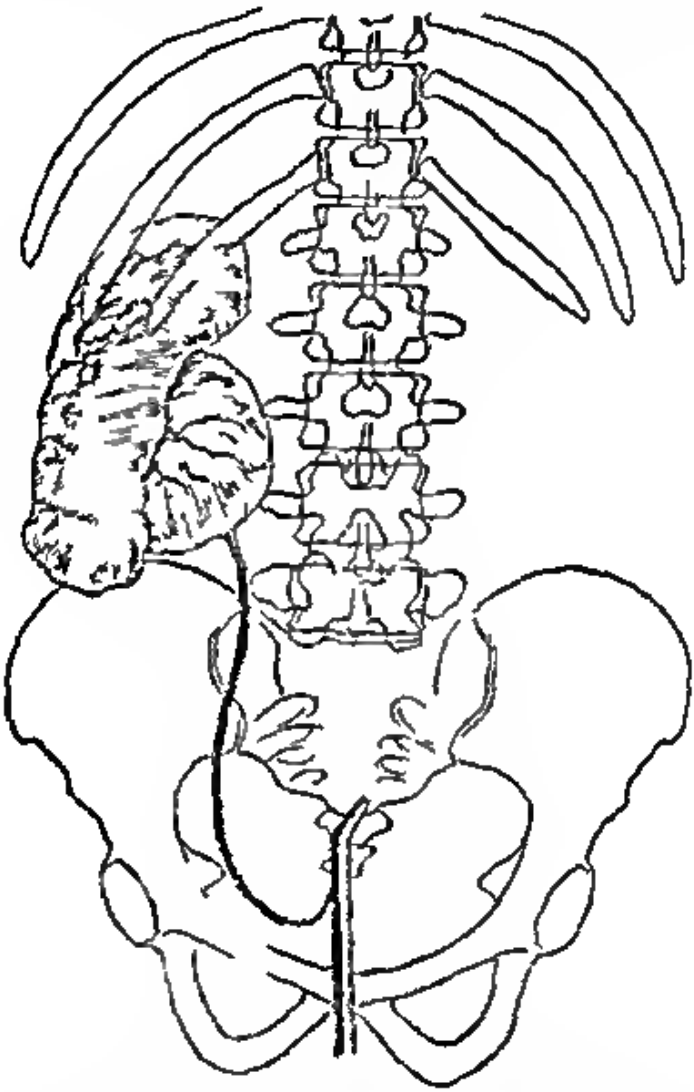

Fig 18 —Hydronephrosis secondary to inflammatory stricture of the right ureter Note x-ray catheter inserted to level of stricture in lumbar portion of ureter

urine is ejected from it No 5 ureteral catheter cannot be passed further upward into the right ureter than to a point corresponding to the junction of the middle and upper thirds The stricture does not permit even of the passage of a filiform ureteral catheter For this reason and on account of the fistula previously referred

to, it is impossible to fill the ureter above the point of obstruction with fluids like thorium collargol, or argentide which we permit to flow by gravity through the ureter in order to obtain information in regard to the degree of dilatation of the ureter or renal pelvis This is a method of diagnosis known as ureterography or pyelography as the case may be Although this method is condemned by some as being a very dangerous one I feel that if we do not employ force to inject the fluid but permit it to flow in by gravity it is no more dangerous than a cystoscopy We have inserted an *x* ray catheter to the point of constriction and taken an *x* ray picture of the entire urinary tract This demonstrates that the stricture in the right ureter is located at the level of the upper border of the fifth lumbar vertebræ *i e* in the lumbar portion of the ureter close to a large shadow which is evidently the much distended renal pelvis and kidney (Fig 18)

The functional test (phenolsulphonephthalein) and examination of the urine obtained by catheterization of the opposite kidney show that a nephrectomy of the right sided infected hydronephrotic kidney would be a safe procedure We shall now proceed to perform a right nephrectomy

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of albumin and hyaline and granular casts These threatening uremic symptoms yielded rapidly to treatment and patient was

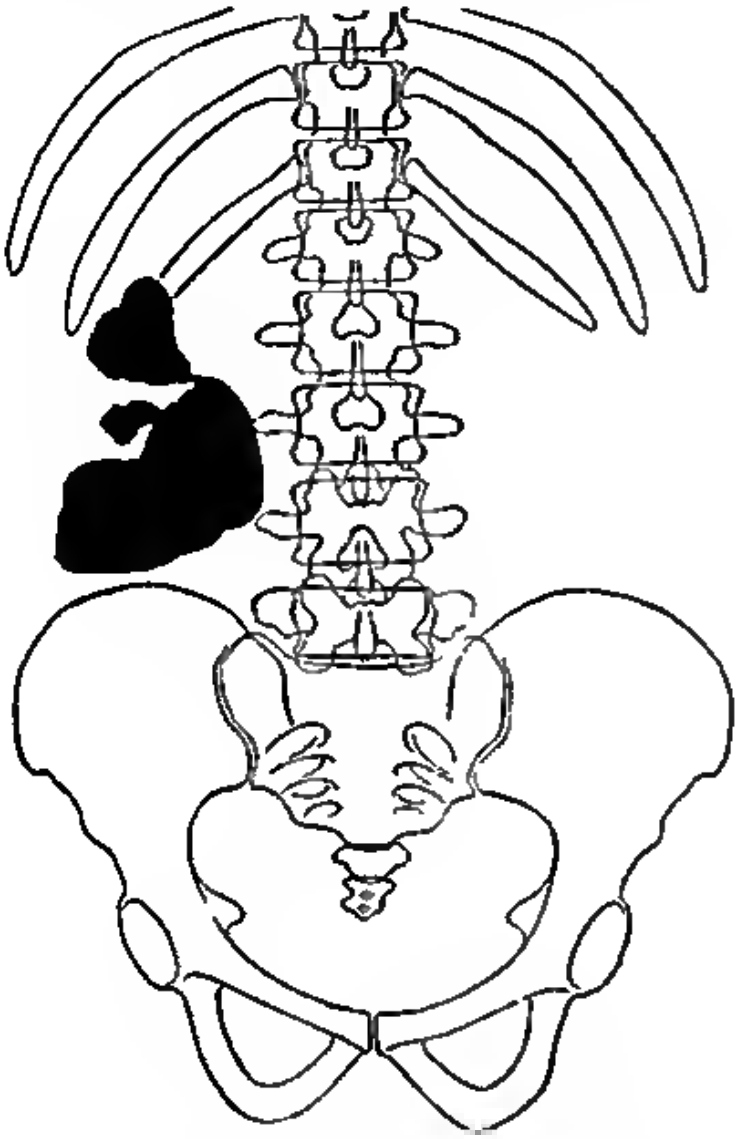

Fig 20—Pyelogram of hydronephrosis due to stricture in lumbar portion of the right ureter

able to get up on the tenth day The wound discharged for about three months but remained healed after that time

DISCUSSION OF ETIOLOGY OF STRICTURE IN ABOVE CASE AND OF STRICTURES OF THE URETER IN GENERAL

The most convenient division of strictures of the ureter from the standpoint of etiology is into congenital and acquired as follows

- Congenital
  1. Valve formation (Fig 21)
  2. Actual narrowing—more or less complete (Figs. 22 and 23)
  3. Spiral twists (Fig 21)
- Acquired
  - Extrinsic causes
    1. Compression by neoplasms.
    2. Accessory vessels to lower pole of kidney (Fig. 28)
    3. Trauma to peri-ureteral tissues
  - Intrinsic causes
    1. Inflammatory (pyogenic)
    2. Secondary to tuberculosis of kidney (Fig 27) or bladder
    3. Secondary to impacted calculus (Figs. 25 and 26)
    4. Primary carcinoma of ureter

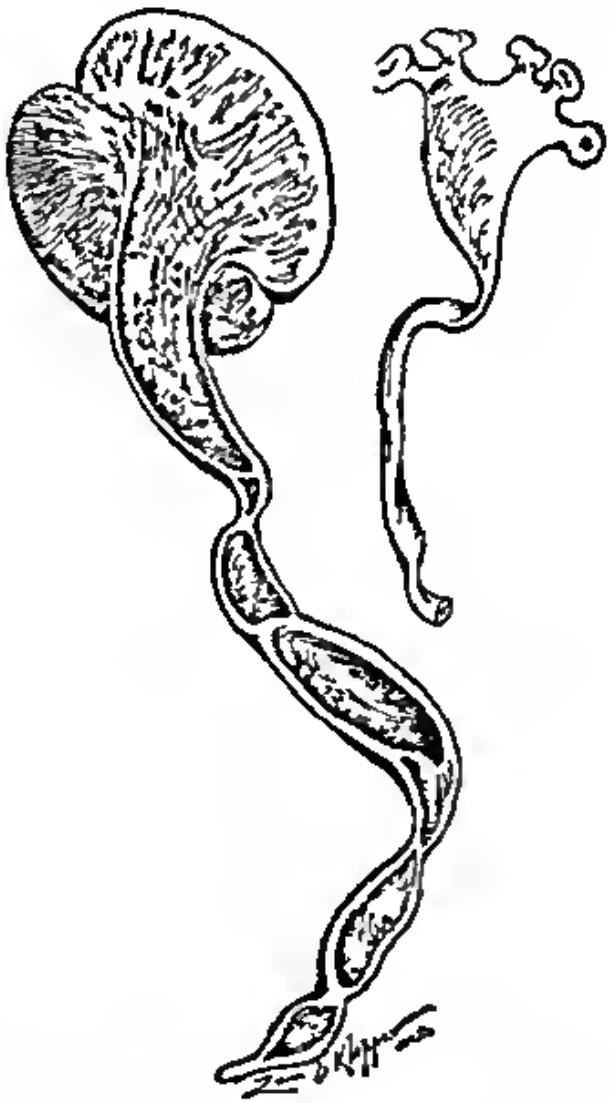

Fig 21.—Sectional view of human ureter showing normal points of constriction valves within lumen and spiral twists of the ureter (Byron Robinson)

Congenital Stenoses of Ureter.—Now let us first consider the congenital forms These are held to be rather rare by some

Fig 22.—Single fetal ureter on one side shows points of stenosis just below kidney and above bladder with marked hydro-ureter between points of constriction Normal bladder ureters both greatly dilated as result of obliteration at lower end with entrance into bladder (Bostrom)

writers (Caulk Hunner) but the contributions on this subject by Bottomley[1] and myself[2] demonstrate that they do not occur

[1] Annals of Surgery 1910 vol lii 537

[2] Surg Gyn and Obst 1911 vol xii 533 Jour Amer Med Assoc 1911 vol lvi 120 Annals of Surg May 1917 vol lxv 553

as infrequently as we have been led to believe They seldom show any symptoms in early life, and in my last case the patient who had complete congenital obliteration of the ureter just above the bladder (Fig 23) was fourteen years old when the first symptom appeared and was operated on at the age of twenty

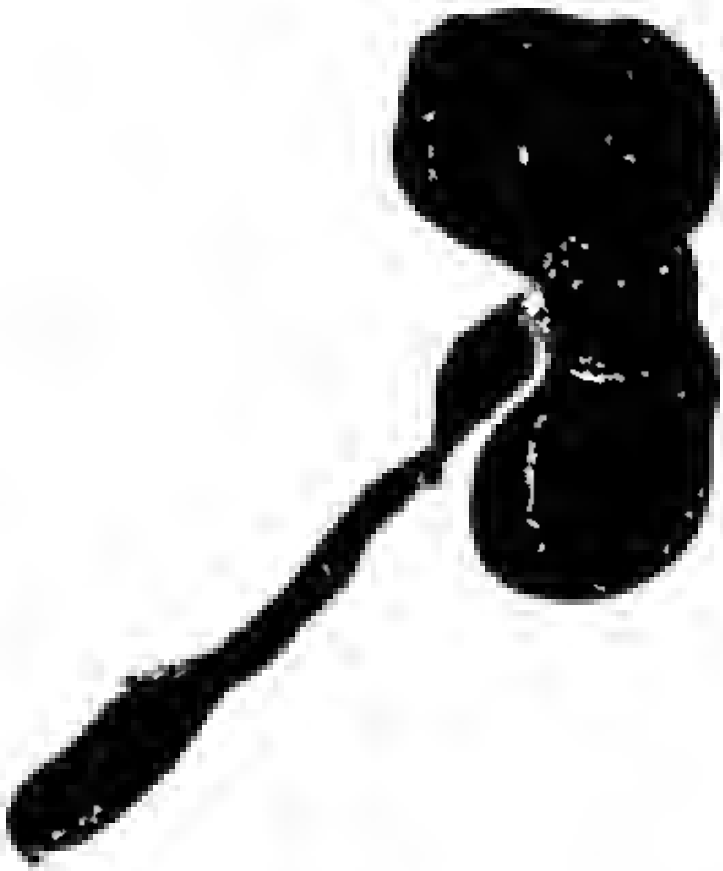

Fig 23 —Photograph of hydronephrotic kidney and hydro-ureter from one of narrowing just below renal pelvis

eight Congenital stenoses of the ureter are not always the result of obliteration of the lumen but are frequently the result of a spiral twist in the course of the ureter or the persistence of fetal valves (Fig 21) The congenital obstructions due to obliteration of the lumen may be permeable or impermeable and are found in one or more of three locations i e just within or above

the bladder at the brim of the pelvis or at the junction of the ureter and renal pelvis (Fig 23)

There may be stenoses simultaneously present at two levels and marked dilatation of the ureter between the two The ureter and kidney seldom attain such an enormous degree of dilatation in acquired (Fig 23) as they do as the result of congenital stenoses of the ureter

In the 5 cases reported by me in the article[1] referred to the ages of the patients when the first symptoms appeared varied from seven to twenty-eight years Up to the time of the publication of this article 67 cases had been recorded including my 5 cases The most important cases are those in which the vesical end of the ureter is closed so that the greatly dilated lower end of the ureter protrudes into the lumen of the bladder the protrusion varying in size from that of a small pea to one which fills the entire interior of the bladder A survey of all of the published cases of congenital stenosis of the ureter shows that clinically they belong to four classes

(1) Those in which the condition remains latent throughout life and is an accidental finding at autopsy (Fig 22) The majority of the published cases belong to this class (2) Those in which an abdominal tumor usually an enormously distended ureter or kidney or both (Fig 23) is found clinically (3) Cases with acute onset of symptoms of renal infection the operation disclosing the underlying condition (4) Those in which disturbances in micturition are the principal symptoms usually cases of intravesical protrusion of a closed lower end of the ureter (Fig 22)

Acquired Strictures —*Inflammatory* —Kelly and later Hunner[2] have called attention to an important clinical group of cases of strictures of the ureter in women Hunner believes that they are usually due to metastatic infection of the wall of the ureter the primary disease being in the teeth tonsils etc In 12 of his 50 cases the condition was present on both sides

[1] Annals of Surgery vol lxv May 1917

[2] New York Med Jour vol civ July 1916, and Johns Hopkins Hospital Bulletin 1918 xxix 1

The clinical picture under which this form of stricture of the ureter appears is not unlike that of the congenital variety viz. (*a*) as hydronephrosis, (*b*) intermittent attacks of renal colic (*c*) as pyelitis resistant to pelvic lavage Of his 50 cases 2 were of gonorrheal origin 3 due to cystitis and the remainder metastatic. The stricture was within 6 cm of the bladder in 53 cases, near the pelvic brim in 8 and near the kidney in 1 case

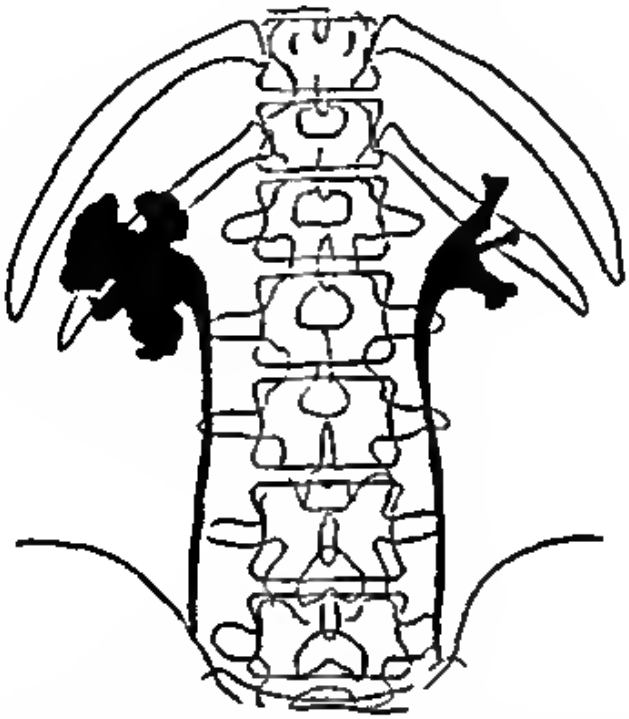

Fig 24.—Tracing of pyelogram from author's case of right-sided traumatic stricture of the lumbar portion of the ureter with secondary dilatation of renal pelvis. Compare large irregular shadow of hydronephrotic kidney with normal shadow of opposite side.

Strictures of syphilitic origin have so far as I know never been described but there is no reason why they should not exist here as in other hollow viscera

Strictures Due to Injury and to Impacted Calculi.—Although laceration of the ureter as the result of blows or other forms of non penetrating injury do not occur frequently one must not overlook such a possibility In the patient whose pyelogram is shown in Fig 24 a blow over the right kidney region was followed a few weeks later by attacks of colicky pains radiating

downward along the right ureter Upon attempting to insert a catheter into the right ureter, obstruction was encountered in its lumbar portion and a pyelogram revealed a moderate degree of hydronephrosis (Fig 24)

A most instructive example of how a calculus impacted in the ureter can cause a decubital ulceration of the mucosa with resultant stricture formation and hydronephrosis is shown by the case from which this specimen was obtained (Fig 26) This patient was a girl of twenty who had suffered from attacks of ureteral

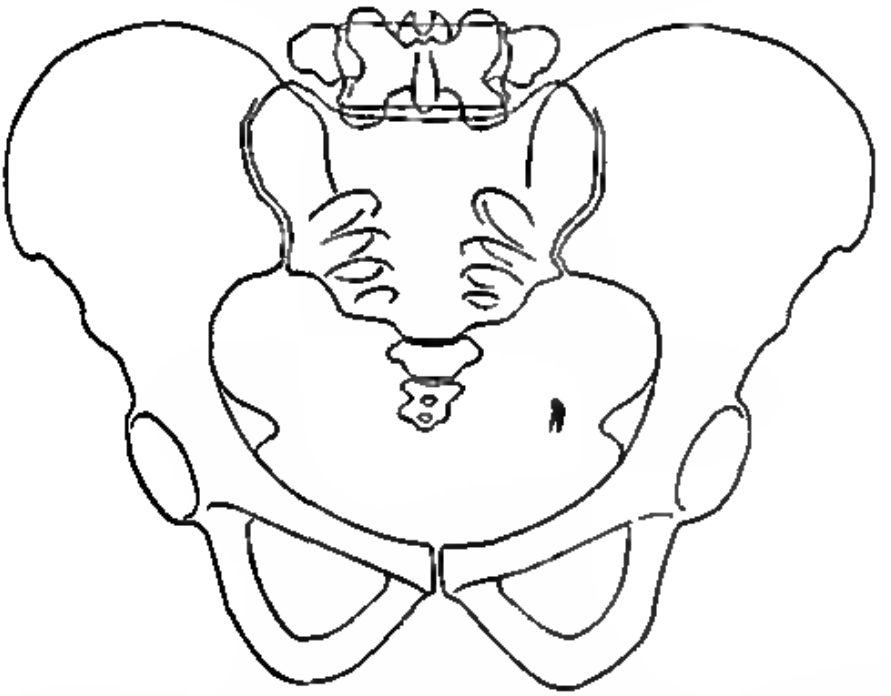

Fig 25 Ray tracing of calculus impacted in pelvic ureter complicated by atrophy of infected hydronephrosis and stricture of ureter at point of impaction (author's case)

colic for a number of years A Ray examination showed a tooth shaped calculus in the pelvic portion of the right ureter (Fig 25) After removal of this calculus a urinary fistula persisted There was complete obliteration of the ureteral lumen at the point where the calculus had been lodged On account of the presence of an infection of the kidney a removal of this organ was necessary and revealed the fact that back pressure upon the kidney with marked dilatation of the renal pelvis and calyces accompanied by infection had existed for some time

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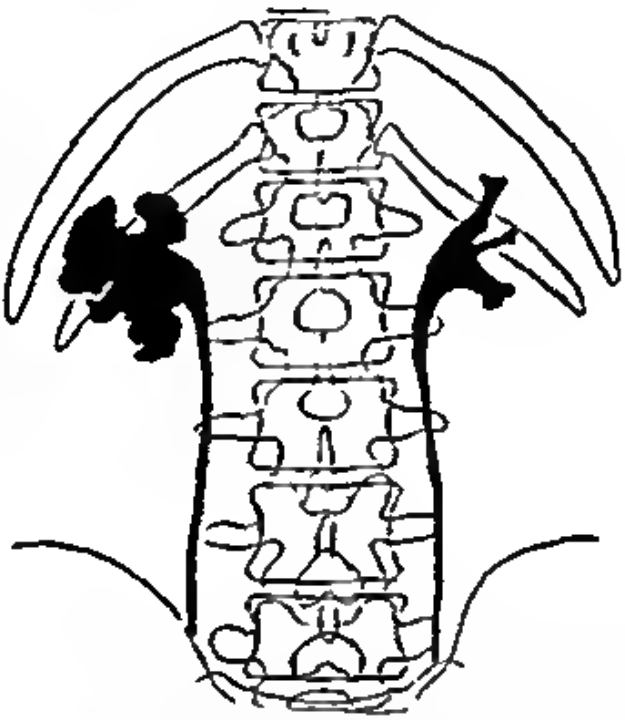

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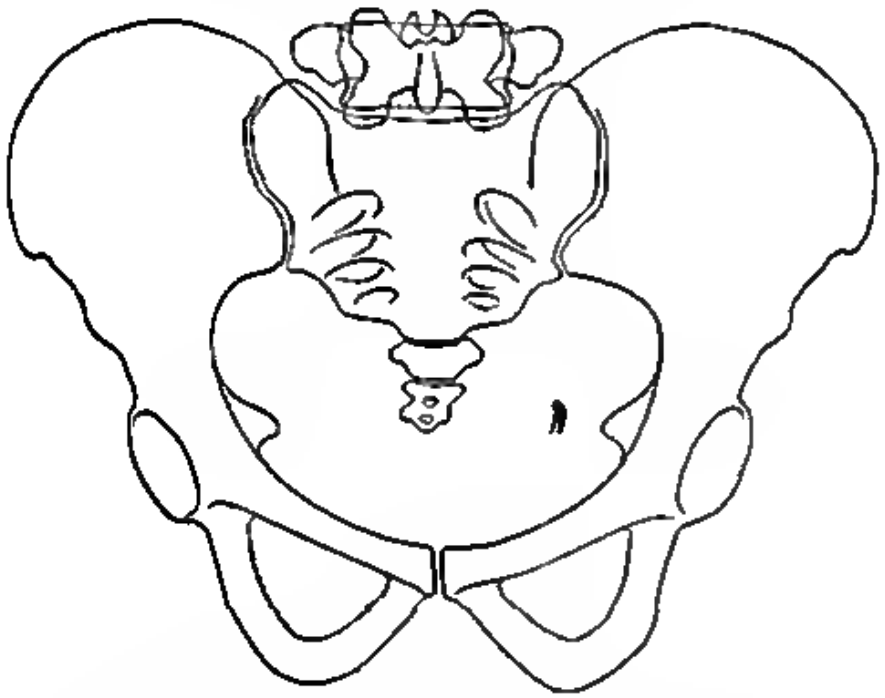

Fig 25 X Ray tracing of calculus impacted in pelvic ureter complicated by renal infection and hydronephrosis and stricture of ureter at point of impaction (author's case)

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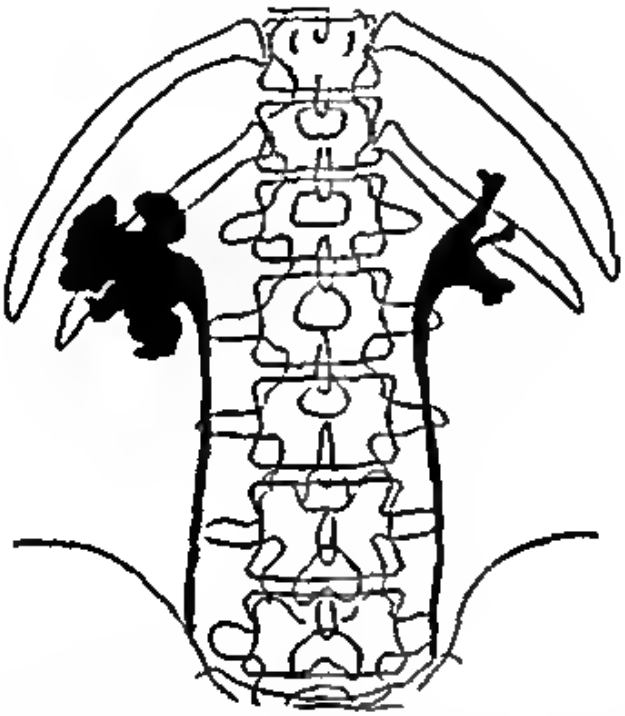

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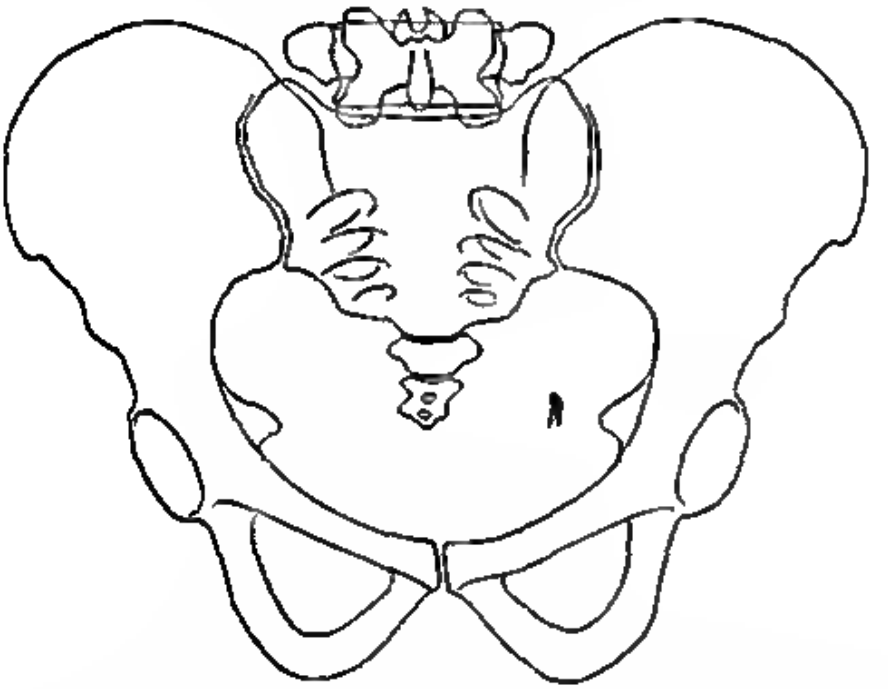

Fig 25 Ray tracing of calculus impacted in pelvic ureter complicated by advanced infected hydronephrosis and stricture of ureter at point of impaction (authors case)

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trinsic strictures of the ureter A primary carcinoma of the ureter is comparatively rare but a sufficiently large number of cases have been reported to justify such an origin in the differ ential diagnosis of ureteral strictures

Other but rarer causes of stricture of the ureter of an inflam matory nature are those following gonorrheal infections of the ureter of which several cases have been reported and again strictures of the ureter due to extension of the infection from a peri ureteritis complicating pelvic infections in the female

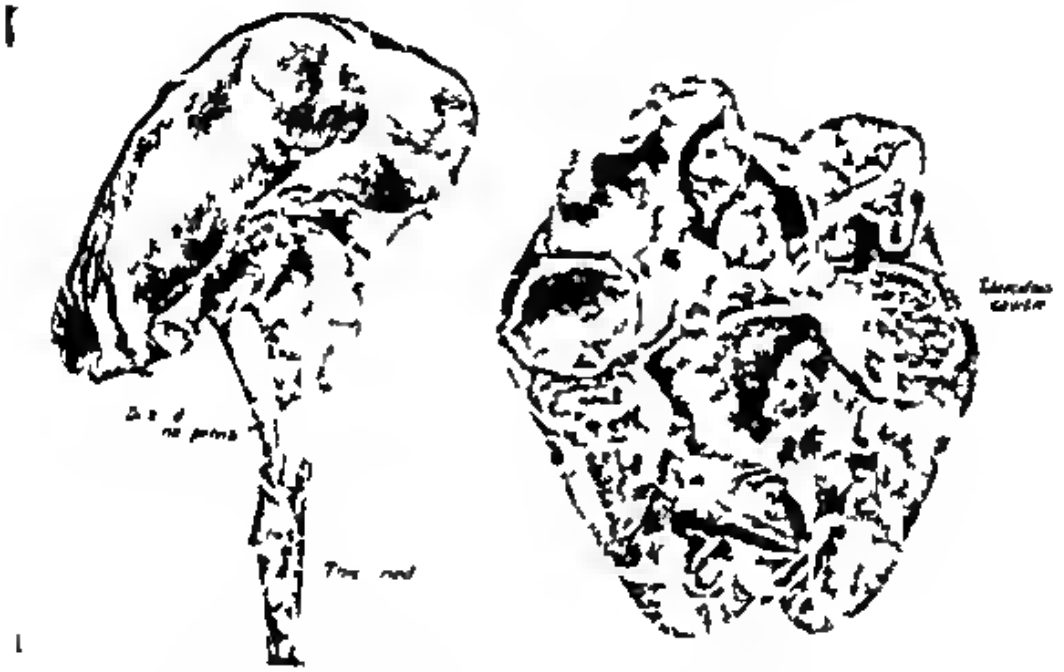

Fig 27.—External appearance (on left) and sectional view (on right) of typical example of dilatation of the ureter and renal pelvis secondary to a tuberculous stricture of the ureter in a case of tuberculosis of the kidney

Rarer causes of stricture are those due to inclusion of the ureter in ligatures applied during hysterectomy and temporary inclusion of the ureter in the bite of the artery forceps during similar opera tions

Stenosis of the Ureter Due to Compression of the Lumen by Accessory Vessels at the Lower Pole of the Kidney.—Attention was first directed to this subject by an article of Lichorn s (Arch f klin Chir 1907 82 955) but the clinical importance of such an anomaly was not appreciated until W J Mayo (Jour Amer Med Assoc 1909 62 1383) reported a number of

Other causes of acquired stricture of the ureter are tuberculosis and carcinoma The former may cause occlusion of the lumen at a comparatively early period or not until a late stage of the process I have observed such strictures due to tuberculous ulceration with secondary cicatrization at all levels If it occurs near the bladder the ureter and renal pelvis (Fig 2)

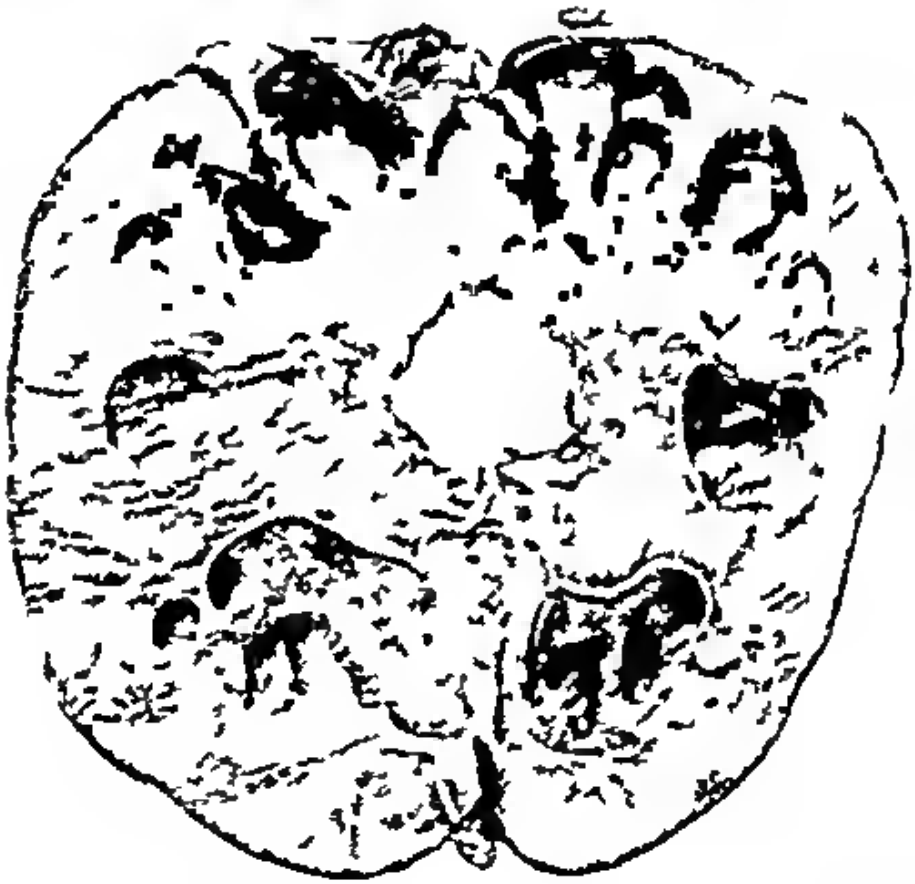

Fig 6—Hydronephrotic kidney from case of stricture of the ureter due to calculus impacted in portion of ureter Note dark color of mucous lining of the moderately dilated calyces of renal pelvis showing marked infiltration

become very much dilated If the stricture is at the junction of the ureter and renal pelvis an enormous hydronephrosis may result the tuberculous origin of which is often difficult to demonstrate Neoplasms especially those having their origin in the structures of the true pelvis uterus bladder etc) may cause compression of the ureter with symptoms like those of true in

ureteral orifice and a normal right one A ureterogram revealed the presence of a distinct kink in the left ureter opposite the transverse process of the fourth lumbar vertebra with a

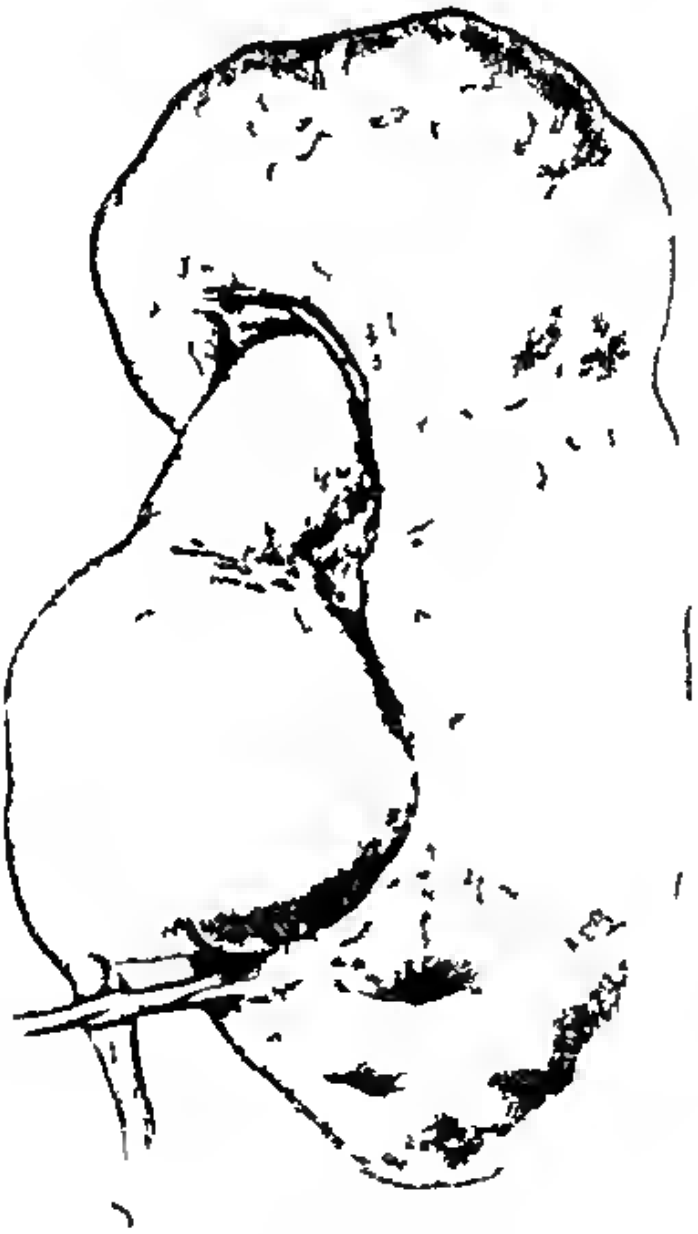

Fig 28.—Obstruction of ureter due to accessory artery and vein to lower pole of kidney (author's case)

dilatation of the ureter above that point and a moderate degree of dilatation of the renal pelvis itself

At operation during this stay in the hospital we found that the left kidney was greatly enlarged and tensely distended with

cases which he had observed The accessory artery in all but 2 of the 20 cases came directly from the aorta and at times was behind and in others in front of the ureter, but in either of these positions the pressure of the artery on the ureter or the adhesions between the vessels and the renal pelvis were capable of developing a kink Ekehorn in his series of 25 cases of hydronephrosis found the accessory vessels anterior to the ureter in 64 per cent and posterior in 28 per cent If those vessels are posterior the ureter is kinked at the point of stenosis while if they are anterior it is compressed

I desire to show you here a specimen (Fig 28) from a most typical case of the variety where the accessory vessels lying anterior to the ureter caused compression with the development of a secondary hydronephrosis The patient was a boy of nineteen He was first seen on November 13, 1916 He gave a history of having been perfectly well up to the time when he received a kick in the left lumbar region while playing football two years before (1914) Since that time he had recurrences of colicky pains radiating down the ureter once a month lasting one to two days For a period of six months prior to my first examination these attacks had recurred about twice a week There were no disturbances in urination during the attacks The pain was especially marked over the region representing the anterior portion of the abdomen The past history was negative

A careful examination was made of the urinary tract at that time with negative results the only finding being that the left ureteral orifice was slightly more prominent than the right and was edematous

He was seen a second time in March 1917 In the interval [illegible] (right)

He was re admitted on May 1st 1917 At that time the symptoms were more marked over the left kidney there being a distinct tenderness in the left iliocostal space Roentgenograms of the urinary tract failed to show any abnormal shadows Cystoscopy revealed a slightly edematous and reddened left

ureteral orifice and a normal right one A ureterogram revealed the presence of a distinct kink in the left ureter opposite the transverse process of the fourth lumbar vertebra with a

Fig. 28.—Obstruction of ureter due to a cessory artery and vein to lower pole of kidney (author's case)

dilatation of the ureter above that point and a moderate degree of dilatation of the renal pelvis itself

At operation during this stay in the hospital we found that the left kidney was greatly enlarged and ureter dilated with

fluid On the surface of the kidney were a number of scattered miliary abscesses The size of the kidney was in a great measure due to the enormous enlargement of a tensely filled pelvis This enlargement ended abruptly at the point where the ureter began and this sudden change in caliber was due to an almost complete obliteration or compression of the lumen of the ureter by an aberrant artery and vein each about the size of a darning needle which passed directly from the aorta to the lower pole of the kidney (Fig 28) As soon as these were divided after being ligated fluid was immediately seen to pass from the tensely distended pelvis into the ureter past the former point of constriction. The main renal vessels entered the middle of the hilum of the kidney On account of the extensive infection present it was deemed advisable to perform nephrectomy

The patient made an uneventful recovery The kidney on section showed the typical picture of an infected hydronephrosis with only a narrow rim of the parenchyma left

The latency of the symptoms up to the age of sixteen can only be explained by the fact that not until the trauma had caused some disturbed renal conditions that is the congestion of the ureter at the point of constriction did the symptoms of obstruction appear and these only became more manifest when the infection set in

DIAGNOSIS AND TREATMENT OF URETERAL STRICTURES

The clinical pictures under which ureteral strictures appear are as a rule as follows

1 Recurrent attacks of colicky pain simulating appendicitis ureteral calculi and kinking of the ureter due to movable kidney In every doubtful case of appendicitis one should never neglect a thorough examination of the urinary tract as a routine procedure before operation is done

2 The appearance of a tumor in the kidney region may be the first sign of the presence of a stricture or obstruction of the ureter

3 Evidences of renal infection chills fever etc) with or without previous symptoms like tumor or ureteral colic may be the predominant features of the case

4 Unusually severe reactions from ureteral catheterization either in the form of pain or symptoms of infection are recorded by Hunner as of great importance in leading one to suspect the presence of ureteral stricture

Instrumental examination that is the introduction of bougies of different calibers supplemented by ureteral pyelography is the only accurate method of making a diagnosis of ureteral stricture when a renal tumor is not present In passing the ureteral bougies or catheters in suspected cases one must not overlook the fact that the instrument may catch in the folds of mucous membrane and in the inexperienced hand lead to the diagnosis of true ureteral obstruction For the purpose of determining the caliber of the stricture the use of a set of bougies such as those shown in Fig 29 is necessary These are easier to insert as a rule in the female than in the male Garceau s tapering catheter is also of great value in the diagnosis and treatment of such strictures If the presence of infection contraindicates the use of the dilating bougies or the stricture is of an impermeable character operative procedures must be considered

For strictures at the upper portions of the ureter a form of plastic operation after the manner of performing pyeloplasty by the Heineke method has been successful in a number of cases I nd to end anastomosis and similar methods of ureteral anastomosis have never been successful in the human being on account of the infection present as well as the tendency to stricture formation at the point of anastomosis

At the lower end of the ureter if dilatation is unsuccessful one must consider the advisability of dividing the ureter above the point of stenosis and reimplanting it into the bladder by one of the generally accepted methods of performing this operation

In cases of impermeable stricture and in those accompanied by a considerable degree of hydronephrosis as in the case just reported nephrectomy with removal of the ureter down to the point of stricture is the only method of procedure

Operative treatment of congenital strictures does not differ from that of the acquired variety except that the question of

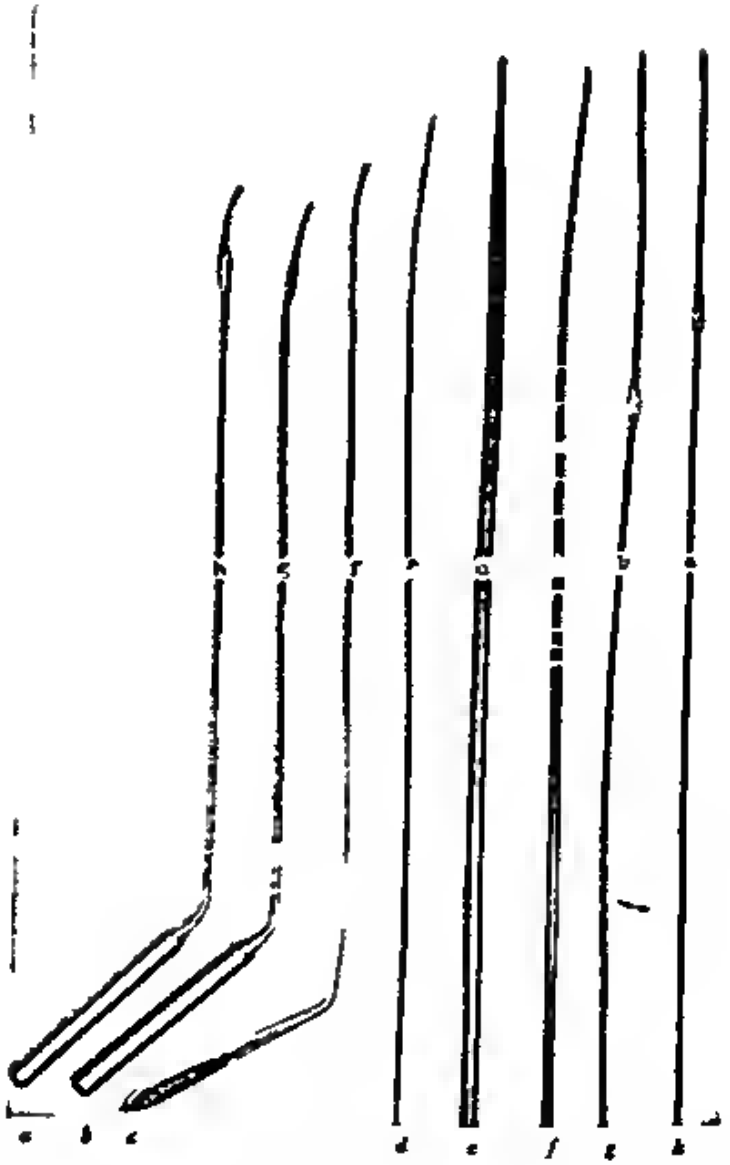

Fig. 29 Set of ureteral catheters etc used by Dr Gu L Hunner *a* Blunt round tip renal catheter with wax bulb *b* olive tip renal catheter with large wax bulb protected on either side with smaller bulb Garceau graduated whistle tip catheter *d* flexible bougie (3 mm diameter—sizes are from 3 to 10 mm, the smaller sizes being useful for dilating through the cystoscope from below and the larger sizes for retrograde dilatation from above whalebone filiform—various sizes are used through the cystoscope *f* metal searcher with olive tip *g* metal bulb dilator (3 mm.) with curved olive tip *h* metal bulb dilator mm. with curved olive tip

operative procedure is much more difficult to solve on account of the enormous dilatation with the resulting thinning of the walls of the ureter above the point of stenosis

CLINIC OF DR ROGER T. VAUGHAN

Cook County Hospital

ACUTELY STRANGULATED INTRA-ABDOMINAL TUMORS

Summary Case I Large ovarian cyst acute torsion of pedicle with hemorrhage into cyst and into the peritoneal cavity, removal of cyst by laparotomy Case II, Tubo-ovarian cyst with twisted pedicle removal of cyst by laparotomy, discussion of pathology symptomatology, diagnosis, and treatment of acutely strangulated intra abdominal tumors

CASE I

History —The patient is a married woman, aged forty eight; nationality Irish, occupation is chiefly housework

Three days ago, on Monday, June 11, 1817, on getting out of bed in the morning she felt a sudden sharp pain in the right lower quadrant of the abdomen It was cramp like, or, as she describes it, 'like a labor pain" The pain was followed immediately by vomiting and a feeling of extreme weakness Soon thereafter the patient says she fainted, but the "faint" lasted only a few minutes and she was not completely unconscious, she thinks The pain and prostration were so severe that the patient went back to bed and remained there all day, the pain still being confined to the right lower quadrant, but not increasing in severity

The next morning, Tuesday, while still in bed the patient had a sudden and even more severe recurrence This too, was right lower quadrant pain She actually fainted this time and remained unconscious for some minutes The prostration was very severe A doctor was called, who took her temperature and reported it to be 102° F He said that her trouble amounted to nothing, that she was merely pregnant!

The pain continued throughout the day and night and the patient, who did not believe herself pregnant but thought she

had some serious trouble had another doctor called who made a diagnosis of abdominal tumor and advised her to go to the hospital for operative removal She was afraid of the knife then and declined but today the pain and vomiting continuing unabated as on the three previous days, she consented and was brought here

She has been quite thirsty ever since the onset of the pain on Monday While in bed she has been restless Her folks noticed on Tuesday that she looked pale and they thought her face swollen She noticed no dimness of vision no shortness of breath, and no jaundice Her bowels did not move Monday, Tuesday or Wednesday, but they moved spontaneously this morning (Thursday) in moderate quantity

Her last menstrual period was May 20th The flow was not quite so profuse as usual There has been no bloody vaginal discharge at all since then Her next preceding period was about April 20th and was of usual duration She does not believe herself pregnant Her flow is usually from two to three days but the periods between flow vary sometimes from the twenty-eight-day type She has been married twenty two years and has had five normal full term deliveries and one miscarriage at eight months Last pregnancy was eight years ago

She has had no previous illness except rheumatism

Examination.—The patient s pallor is striking in so well nourished a woman She is greatly prostrated but not especially dyspneic. On entrance to the ward the following observations were recorded Temperature 102° F pulse 108 thin and thready respirations 24

Examination of the head neck and thorax is negative The *abdomen* is rather distended There is dulness on percussion in the right flank extending up as high as the umbilicus Anteriorly and in the left flank there is tympany There is some increased resistance to palpation in this area but no mass can be definitely outlined Peristaltic sounds are present There is no peritoneal friction rub audible

Vaginal examination shows a little thin bloody discharge (the patient s menstrual period is just about due) No particular

change in color of the vaginal mucosa The uterus lies rather high but can be moved in every direction, though not quite so freely, perhaps as normally The right fornix seems to show a little more resistance than the left but no mass is palpable There is no tenderness on vaginal examination

Blood pressure Systolic 122 diastolic 84 Blood examination White cells 17,000, red cells 2 370 000, hemoglobin 50 per cent Urine examination is negative no albumin or casts

Comments —Dr Hallock who is on the examining room service and admitted the patient to the hospital made a diagnosis of ovarian cyst with a twisted pedicle The intern who wrote the history thought a ruptured ectopic pregnancy more likely in view of the bloody show found on vaginal examination and the low red count and low hemoglobin percentage Both interns recognized at once the urgent nature of the case and the necessity for immediate laparotomy I cannot understand how the patient s family physician could have overlooked the urgent nature of the case and assured her that she merely had the vomiting of pregnancy The consultant whom she called recognized the surgical nature of the case and is not in any way responsible for the delay in getting her to the hospital

We must now operate on a woman with only 50 per cent hemoglobin who has been in more or less shock for three days She is nearly fifty years of age Had she been brought here at once after acute abdominal pain prostration and vomiting showing a surgical abdominal emergency her chances for recovery would have been materially improved The blame for this delay is partly the patient s and partly the fault of the family doctor whose incomplete examination or lack of surgical acumen failed to discover the patient's danger Consequently, he failed to urge on her the immediate action so necessary in her case

I am rather surprised that after seeing so many doctors the patient has not had a diagnosis of acute appendicitis made That is so frequently the error in cases of right-sided twisted ovarian cysts or ruptured right ectopic pregnancy Appendicitis, however, can be ruled out easily here There was no diffuse

abdominal pain at the onset The pain was located in the right lower quadrant from the start and has remained there all the time. Its onset was sudden. So excruciating was it that the patient twice fainted from the suffering The pain at the onset of appendicitis is, as a rule, not so severe that the patient goes into shock and faints, whereas with an acutely twisted ovarian cyst collapse or fainting is the rule Furthermore there was no fever with the onset, although the temperature was taken on the second day of illness by the doctor Fever of 102° F has now developed after three days of illness

Ileus is not present Her bowels moved well this morning after three days of constipation Vomiting is no more frequent today than it was at the onset

The intern in his history has well brought out the development of the illness day by day This history in connection with the examination makes me think that we have to deal here with a twisted ovarian cyst rather than a ruptured ectopic pregnancy The bloody vaginal show plus the diminution in the amount and duration of the last flow are somewhat suggestive of ectopic pregnancy, especially in connection with the blood findings, but one must not overlook the fact that *an acutely twisted ovarian cyst usually has considerable hemorrhage into its wall and lumen* and that this hemorrhage may even result in rupture of the cyst and hemorrhage into the free peritoneal cavity Such a peritoneal hemorrhage may be as copious as the rupture of an ectopic pregnancy and may likewise result fatally

In *my* examination in the ward I found dulness and a sense of resistance on the left side whereas the intern noted it on the right. When I first saw the patient I found her lying on the left side and had to turn her back into a recumbent position The fact that the mass and the dulness at one time are on the right and at another on the left side would speak for a movable tumor Why have we not been able to outline a tumor definitely if it is present and producing dulness and a sense of resistance? Probably because it is not tensely filled though the amount of internal hemorrhage she seems to have had would make us think that it should be tense at least with blood Tenseness might also be

lacking in a cyst if ruptured or surrounded by adhesions I do not believe this cyst can be surrounded by adhesions because it seems too freely movable However, these details are not essentials but the diagnostic niceties of the case The important fact to recognize is that this case is an urgent surgical emergency and that immediate laparotomy is necessary All further details of diagnosis can be completed at operation, but this one essential conclusion must be arrived at first

Operation (*Ether Anesthesia*) —On palpating the patient's abdomen (just before making the initial incision) an ill defined mass can be made out filling most of the right half of the abdomen though not reaching quite to the umbilicus anteriorly The patient s muscular resistance being eliminated by anesthesia enables us to palpate much more accurately than in the ward

(Midline incision below the umbilicus)

On opening the peritoneal cavity blood at once flows out rather thin in consistency and with a slight tendency to be stringy With the hand introduced into the abdomen I find a large cyst filling the right flank It is without tenseness A marked twist in the pedicle of the cyst can be felt at the right cornu of the uterus *No clots* appear to be present in the abdominal cavity (always present in ectopic pregnancy) The cyst is so relaxed that it is readily brought out through the hypogastric incision without preliminary puncture It seems to be twisted on the uterus practically a full turn 360 degrees in counter clockwise direction left to right supposing the clock to be facing the uterus The twisting in this case thus follows Kustner s rule The wall of the cyst and its pedicle are suffused with blood as is also the right fallopian tube which lies along the surface of the cyst The fimbriated end of the fallopian tube is filled with a large mass of clots which suggest that the peritoneal hemorrhage may have come from the tube rather than from the cyst (Figs 30 31)

When the cyst was fully delivered from the abdominal cavity no bleeding point or leak could be found in it The pedicle and tube were clamped off close to the uterus and a continuous suture of catgut applied to the stump over which the peritoneum

was then drawn Primary closure of the operation wound was carried out without any attempt to wipe the abdominal cavity thoroughly clean of bloody fluid

Fig 30 —Acute tors on of ovarian cyst on ts pedi e Cop ous hemorrhage into cyst and into peri oneal cavity

Postoperative Comments —While we made the diagnosis of ovarian cyst with twisted ped cle before operation we might better have diagnosed abdom nal tumor with twisted pedicle but since abdominal tumors ith twisted pedicles are ovarian cysts in the great majority of cases we made the immediate

presumption, which proved to be correct, that this was an ovarian cyst A *twisted pedunculated fibroid* could have been more definitely outlined and is smaller in size and usually confined to the pelvis A *twisted hydrosalpinx* too is seldom if ever so large and would also be confined to the pelvis probably Dr A E Halstead of Chicago in one case was able to recognize the twist in the ovarian pedicle on bimanual examination thus making the diagnosis absolutely positive before operation

Fig 31—Tubo-ovarian cyst with twisted pedicle Removal of cyst by laparotomy

But few operators have had the dexterity in palpation to enable them to make out this point

Have you ever seen a case of *massive spontaneous hemorrhage from a normal ovary?* Such a hemorrhage may much resemble that of a ruptured ectopic pregnancy in its severity It most often comes from a ruptured corpus luteum Occasionally there may be some slight injury preceding it Primrose[1] reported

[1] Primrose Hemorrhage into the Peritoneal Cavity Caused by Accidental Rupture of the Ovary Univ of Toronto Med Bull v 1 1 18 1912 Also in Annals of Surgery July 1912

was then drawn Primary closure of the operation wound was carried out without any attempt to wipe the abdominal cavity thoroughly clean of bloody fluid

Fig 30—Acute torsion of ovarian cyst on its pedicle Copious hemorrhage into cyst and into peritoneal cavity

Postoperative Comments—While we made the diagnosis of ovarian cyst with twisted pedicle before operation we might better have diagnosed abdominal tumor with twisted pedicle, but since abdominal tumors with twisted pedicles are ovarian cysts in the great majority of cases we made the immediate

because of the risk of abortion Where both ovaries are cystic only one strangulates as a rule but in some reported cases both have strangulated simultaneously during pregnancy, thus neces sitating bilateral ovariectomy Dr Channing W Barrett of our County Hospital staff once performed successfully such a double ovariectomy The patient recovered and pregnancy was uninterrupted

Do you know that graafian follicles cannot infrequently be demonstrated in the pedicle of such a twisted cyst so that when both ovaries are twisted it may be possible to save some graafian follicles in the pedicles although practically all the ovary is resected?

Notice in the pedicle of this tumor how the dilated veins stand out beneath the peritoneum as tortuous convolutions whereas the artenes do not appear Edward Payr[1] some years ago tried to make out a case for passive congestion in the tumor as the cause of the twisted pedicle He made a very elaborate study and his theory has some truth back of it but his models and manipula tions represent only partially the conditions obtaining in the abdomen Passive congestion exerts its influence slowly These strangulated cases occur suddenly and usually give a history of a twist turn bend or strain after which the pain came on imme diately with profound shock and collapse Such observations seem to indicate that the twist occurs in response to mechanical conditions inside the abdomen

The twist occasionally involves surrounding viscera The omentum is the structure most frequently involved but the bowel too may be caught In such a case mechanical ileus from angula t on may supplant the usual pseudo ileus accompanying the twist In a recent case at the County Hospital operated on by Dr Bertha Van Hoosen the appendix was caught twisted and strangulated in a fold of the pedicle If such a twist occurred slowly under the influence of congested veins in the pedicle wall as Payr maintains the viscera should have ample time to escape involvement

[1] Payr Edward Deut Ztschr f Chir Festschrift, E Bergmann 1906 lxxxv pp. 392-451

a case of ruptured normal graafian follicle following the lifting of a heavy weight and another case following an attack of vomiting Fortunately these hemorrhages are quite unusual and the symptoms of internal hemorrhage are so definite that an exploratory laparotomy is done which enables one to make the diagnosis as well as to stop the hemorrhage Ohman Seedorf Hendley and Savage have reported similar cases

The subject of strangulated ovarian cysts is somewhat neglected in the text books In fact the entire subject of the twisting of intra abdominal pedicled structures is not considered at length in most surgical or gynecologic works It is usually tacked on as an abbreviated appendix to the chapter on ileus

Strangulated ovarian cysts are not at all infrequent in the County Hospital They present a definite clinical picture and it is surprising with what readiness our interns make the diagnosis after they have seen their first case Of course where the twisting of the cyst takes place slowly without acute symptoms the diagnosis is more difficult but I am speaking now of acute cases One of the best articles on the subject and one well worth reading for any abdominal surgeon is that of K I Sanes[1] It includes a careful study of the literature and the report of 9 personal cases observed in nine years time—evidently not a rare condition

Do you know that in this enlightened surgical age 6 per cent. of patients with ovarian cysts die as the result of strangulation? Why? Because either the doctor or patient procrastinates The cyst is recognized but not operated Strangulation occurs and is treated by watchful waiting Operation for relief of strangulated ovarian cystoma when performed early should have a lower surgical mortality than acute appendicitis operated in the first twenty four hours *Procrastination is the thief of life* surgically speaking for operation is useless in such cases when after days of senseless waiting fatal toxemia or nephritis or peritonitis are far advanced It is the perverse nature of these cysts that they often take it upon themselves to twist when the patient is far enough along in pregnancy to make laparotomy dangerous

[1] Sanes, K I Torsion of Ovarian Cysts Report of cases Amer Jour Obst, New York, 1911 lxiv 6

the first day, but it dropped to normal on the second She made an otherwise uneventful recovery The temperature was probably due either to absorption of fibrin from the exuded blood or to absorption of products of protein disintegration escaping into the peritoneal cavity from the gangrenous cyst

CASE II

History —The patient, a German housewife, married, aged fifty five years, was admitted to the hospital October 15 1916, at 8 10 P M

At 9 30 o'clock this morning (October 15th) while bending over to get some flour, the patient experienced a sudden severe pain in the left lower quadrant of the abdomen She straightened up quickly, but the pain continued and remained so severe that after about one and a half hours she decided to see a doctor While dressing to go to his office she vomited for the first time Just after boarding the street car she vomited again much to her embarrassment Since then she has vomited several times In her words she vomits everything she eats

The doctor, after examining her gave her a *hypodermic of morphin!* The patient returned home but the pain continued severe in spite of the drug Consequently, the doctor advised her this evening (October 15th) to come to the hospital for an exploratory operation

The character of the pain has been cramp like and has constantly remained localized to the left lower quadrant—no radiation No urinary symptoms No chills or fever today or recently The patient had a bowel movement this morning before the onset of the attack She has never had a similar attack before, but has enjoyed good health except for an occasional attack of tonsillitis and the discomfort her hemorrhoids occasion her She has borne two children both of whom are alive one miscarriage No leukorrhea Menstruation ceased five years ago

Examination —The patient complains of severe pain in the left lower abdomen although her contracted pupils indicate she is still under the influence of morphin Both pupils react to light and accommodation Her face is somewhat flushed Tem

Do not forget that ovarian cysts may occur at any age from infancy upward *Strangulated ovarian cysts in children* are especially apt to be diagnosed appendicitis when occurring on the right side, because one does not always bear in mind their occurrence in the young A vaginal (or, better, a rectal) examination in the young is too frequently omitted by the family doctor

An assistant[1] from the Leipzig clinic a few years ago proposed that one should differentiate an ovarian cyst such as this from ascites by puncturing through the abdominal wall and determining the fibrinogen content of the fluid Fibrinogen is readily precipitated from ascites fluid by concentrated sodium chlorid solution, whereas it is absent in the contents of ovarian cysts. I think, however that aside from the dangers of the puncture—leakage, peritonitis, bowel puncture, hemorrhage, and the like—that had I punctured this cyst and succeeded in getting in, I should have found plenty of fibrinogen due to the blood which has been poured out into the cavity during the strangulation It has the earmarks of a test which was worked out in the library rather than in the clinic

The most important point to emphasize about such a case is the *necessity for immediate operation* If the patient were allowed to go along without operation with her pain kept down by morphin, she would die after some days, either from toxemia or nephritis following necrosis of the cyst If the latter ruptures or bleeds profusely the end would come sooner Those cysts which finally become "parasitic" following strangulation are not acutely twisted cysts like this They are chronic cases, where the twist develops so slowly that adhesions form to the surrounding viscera and so develop a collateral circulation for the tumor before the main blood-supply is shut off

Laboratory Examination of Tumor.—The specimen is a unilocular ovarian cystoma with twisted pedicle No evidence of malignancy Its walls and its contents are thoroughly suffused with blood

Postoperative Course.—The patient ran a fever of 101° F on

[1] Dienst, A Ein einfaches differentialdiagnostisches Hilfsmittel zwischen Ascites und schlaffen Ovarialcysten Münchener med Wochenschrift, 1912 No 50.

Her physician however was considerate of us and sent a statement with the patient telling us that she had been suffering from severe pain in the abdomen during the day and that he thought she most likely had an intussusception of the bowel but nothing infectious or contagious This is the least he should do for us after befogging the clinical picture with morphin We are grateful for his statement even though it doesn t help us any in this case

We do not agree with his diagnosis of intussusception Intussusception you know is chiefly a disease of children Pain and tenderness are not prominent symptoms on the first day but when present are located in the right lower quadrant On the second day tenderness travels with the tumor up the right flank or over to the middle line of the epigastrium Only on the third or fourth day as a rule is the mass and the pain and tenderness on the left side Furthermore the patient states she had a good bowel movement this morning *The recent passage of a formed stool is much against the diagnosis of any form of acute obstruction of the bowel* True one may occasionally see a formed stool pass shortly after acute obstruction has set in This is simply the emptying of an already full rectum and is seen more often with intussusception I think than with any other form of mechanical ileus But even with intussusception it is unusual and is a strong point against an acute mechanical ileus Obstructions due to fibrous strands tumors foreign bodies angulations and strictures give a history of previous constipation which becomes absolute obstipation when the obstruction is complete One rarely has any stool passed with the common (sigmoid) form of volvulus because with the rectum and sigmoid stiffened by a formed stool it is difficult or impossible for a twist to occur

When a patient with an acute abdominal condition passes stool especially a formed stool reflex pseudo-ileus is a more likely diagnosis than mechanical ileus

Pseudo-ileus of reflex origin is very frequent in cases in which an abdominal pedicle has become twisted whether the pedicle be that of an abdominal tumor omentum or of some other abdominal viscus Vomiting prostration tympany diminished

perature, rectally, 99° F on admission, pulse 56, respirations 24 The abdomen is soft, slightly distended and tympanitic. No dulness in the flanks No general or local rigidity In the extreme left lower quadrant at the pelvic brim there is some tenderness on deep palpation, but no mass Auscultation shows peristaltic murmurs present, but not to an increased extent. No visible peristalsis

Vaginal examination reveals a wide introitus and a cervix rather low down There is a round, tender mass palpable in the left fornix posteriorly, rather elastic and not easily pushed away from the vaginal wall This mass appears to be the cause of the tenderness noted in the left lower quadrant on abdominal examination Fluctuation cannot be definitely made out in it. It can also be felt per rectum

Physical examination is otherwise negative

A rectal flushing administered just after entrance to the ward returned practically clear, no blood.

Urine Specific gravity 1020, reaction acid, no albumin or sugar, a few white and epithelial cells, no casts or blood White count 10,200

Diagnosis Probably an ovarian cyst with twisted pedicle

Comments —Note that the family doctor gave the patient a hypodermic of morphin when she came to him This we believe is a dangerous practice unless the patient is to remain under close observation Morphin clouds the symptoms in acute abdominal emergencies especially the symptoms of pain tenderness, and rigidity This is particularly the case when pain is not severe This patient s pain was *not* controlled by the morphin, and from that fact we know it must have been severe indeed. The absence of abdominal rigidity is due partly to the morphin but rigidity is always less in multiparæ than in nulliparæ She has not had enough of the drug to cloud consciousness, although she received two injections It is sometimes very difficult to procure a satisfactory history from a patient whose consciousness has been clouded by morphin and a good history is as essential for the diagnosis of acute abdominal conditions as a careful examination.

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peristalsis and constipation all accompany such a pseudo-ileus *but the stoppage of the bowels is not absolute* The doctor on duty in our examining room was impressed by the constipation due to this reflex pseudo-ileus and admitted the patient to the hospital as a probable case of intestinal obstruction Dr Hein who wrote the history and got the facts carefully hour by hour has I think made the correct diagnosis—acute twisting of an ovarian cyst on its pedicle The globular mass felt in the left fornix has so definitely the consistency and shape of an ovarian cyst that the diagnosis seems to me quite certain I think that the family doctor and our examining room physician must have neglected to make a vaginal examination or made it with the patient too tender and rigid for accurate palpation *Vaginal (or rectal) examination of the pelvic organs should never be omitted in a woman with acute abdominal symptoms,* but if the patient is very sensitive a negative examination does not absolutely exclude the absence of pathology in the pelvis

The diagnosis of twisted ovarian cyst is relatively easy when left sided or when the cyst can be felt by abdominal or vaginal examination or when its presence has been established previous to strangulation A ruptured tubal pregnancy must be excluded in the diagnosis by the signs and symptoms of pregnancy accompanied by acute abdominal hemorrhage A vague indefinite pelvic mass may be felt instead of a sharply outlined firm tumor Hemorrhage into the cyst or less frequently, into the abdominal cavity accompanies the twisting of an ovarian cyst as a rule but the hemorrhage is not copious enough to cause a severe acute anemia like that of a ruptured ectopic pregnancy unless the cyst is large and is filled with the blood or the blood escapes into the free peritoneal cavity An added difficulty in diagnosis arises in the event of a strangulated ovarian cyst complicating pregnancy, especially in the earlier months a not very rare combination Sigmoid diverticulitis left ureteral stone and acute salpingitis may usually be ruled out with ease, but it must not be forgotten that a *patient with a strangulated ovarian cyst runs a fever when the cyst has become gangrenous* A pedunculated fibroid may become twisted on its pedicle and so may a tubal

tumor Strictly speaking one had better diagnose this case as twisting of a pelvic tumor on its pedicle but strangulated ovarian cysts are so much more frequent than other pelvic tumors with twisted pedicles that that should be the probable diagnosis

Operation —Midline incision below navel On opening the abdomen and pushing aside the coils of small bowel a dark colored globular mass about the size of an orange is seen to the left and behind the uterus in the pelvis The patient is tilted into the Trendelenburg position The uterus is drawn up into the wound and the tumor with it The latter is a cyst tightly distended and infiltrated with black blood As it is brought out through the abdominal wound it is seen to consist of a greatly dilated left tube (hydrosalpinx) twisted on itself a little more than a full turn of 360 degrees in a clockwise direction (the clock facing the uterus) that is right to left (This is the usual direction of twisting for a left sided pelvic tumor according to Kustner s law [1]) The fimbriated end of the tube is tightly closed by old scar tissue The ovary is fused with the posterior wall of the cyst The uterus is small and senile The right adnexa appear normal

After the tumor was brought out through the wound its pedicle consisting of the twisted fallopian tube and ovarian and broad ligaments was clamped close to the uterus ligated and cut and the mass removed *in toto* The ligated stump was covered with peritoneum No further exploration of the abdomen was carried out The wound was closed in the usual way in layers without drainage and the usual dressing applied

Postoperative Comments —Our diagnosis of a tumor with twisted pedicle was correct but the tumor has proved to be a twisted hydrosalpinx a much rarer condition and not an ovarian cyst This hydrosalpinx judging by the firm closure of the fimbriated end of the tube (demonstrating it) is evidently of long standing To what former infection it was due we cannot say at present There is no history of venereal disease possibly the infection followed her miscarriage several years ago

Her family physician is to be congratulated on sending her to the hospital so promptly for operation The important thing in

[1] Prof O Kostner Centralbl f Gynecol., 1891 No 11

peristalsis, and constipation all accompany such a pseudo-ileus, *but the stoppage of the bowels is not absolute* The doctor on duty in our examining room was impressed by the constipation due to this reflex pseudo-ileus and admitted the patient to the hospital as a probable case of intestinal obstruction. Dr Hein, who wrote the history and got the facts carefully hour by hour has, I think, made the correct diagnosis—acute twisting of an ovarian cyst on its pedicle. The globular mass felt in the left fornix has so definitely the consistency and shape of an ovarian cyst that the diagnosis seems to me quite certain I think that the family doctor and our examining room physician must have neglected to make a vaginal examination or made it with the patient too tender and rigid for accurate palpation. *Vaginal (or rectal) examination of the pelvic organs should never be omitted in a woman with acute abdominal symptoms*, but if the patient is very sensitive a negative examination does not absolutely exclude the absence of pathology in the pelvis.

The diagnosis of twisted ovarian cyst is relatively easy when left sided or when the cyst can be felt by abdominal or vaginal examination or when its presence has been established previous to strangulation. A ruptured tubal pregnancy must be excluded in the diagnosis by the signs and symptoms of pregnancy accompanied by acute abdominal hemorrhage. A vague indefinite pelvic mass may be felt instead of a sharply outlined firm tumor Hemorrhage into the cyst or less frequently, into the abdominal cavity accompanies the twisting of an ovarian cyst, as a rule but the hemorrhage is not copious enough to cause a severe acute anemia like that of a ruptured ectopic pregnancy unless the cyst is large and is filled with the blood or the blood escapes into the free peritoneal cavity An added difficulty in diagnosis arises in the event of a strangulated ovarian cyst complicating pregnancy, especially in the earlier months a not very rare combination. Sigmoid diverticulitis left ureteral stone and acute salpingitis may usually be ruled out with ease but it must not be forgotten that a *patient with a strangulated ovarian cyst runs a fever when the cyst has become gangrenous* A pedunculated fibroid may become twisted on its pedicle and so may a tubal

CLINIC OF DR WILLIAM HESSERT

Alexian Brothers Hospital

ARTHROPLASTY OF THE KNEE

Summary A patient with bony ankylosis of the knee the result of suppurative arthritis occurring as a complication of acute osteomyelitis of the tibia features of acute osteomyelitis illustrated in history of present case—mode of onset pathology errors in diagnosis operative method of drainage sequestrotomy of entire diaphysis regeneration of diaphysis technic of arthroplasty—exposure of joint fashioning the flaps separation and reshaping of ankylosed bones reconstruction of the joint difficulties and dangers of the operation—how to meet them result in present case after two months

The case for operation this morning is a very interesting one because it presents some of the acute phases of osteomyelitis together with results of delayed treatment and the serious joint complications that arise from such delay It is for the latter condition that the patient is brought here today

This boy is an old patient of mine He came in here on July 11 1910 with the following history

The patient a schoolboy aged ten years was admitted to Alexian Brothers Hospital July 11 1910 His previous history was negative he had always been rugged July 4th one week before admission he was running upstairs and struck his left leg but without great violence That night he felt pain in the left leg and had a chill two very prominent symptoms The next day he had fever the pain became worse and he could not leave his bed The family physician was called and treated him for rheumatism The pain and fever continued for one week and he was brought to the hospital with a fever of 103° F and a pulse of 116

Physical examination was negative except that the left leg from the ankle to the knee was swollen and exquisitely

such a case is to recognize the surgical emergency Had this patient been allowed to go along unoperated for three or four days her pain controlled by morphin the cyst would have become gangrenous and have ruptured into the peritoneal cavity She would have suffered a profound toxemia from protein cleavage products absorbed and would have developed peritonitis too if the tube still contained bacteria These cases like strangulated ovarian cysts when allowed to follow their natural course terminate usually in death Acute nephritis cloudy swelling of the parenchymatous viscera reflex ileus and even acute yellow atrophy of the liver are some of the terminal complications

Dr A. D Bevan of Chicago told me that in looking up the literature of fatty degeneration of the liver following chloroform poisoning he found that a number of cases had occurred in connection with strangulated abdominal or pelvic tumors frequently ovarian cysts He supposed that the two causes might have worked together in producing acute fatty degeneration of the liver I am much inclined to think him correct for nearly all the cases of strangulated tumors with acute yellow atrophy or fatty degeneration of the liver which I have run across come from the German literature and the Germans in the past as in the present have always been great devotees of chloroform narcosis.

Did you know that the normal tube and ovary sometimes undergo spontaneous torsion and strangulation just as the testicle does? Auvray[1] has collected a series of such cases It is a condition which should be borne in mind in cases of severe acute pelvic pain. Whitacre[2] reports 2 cases of hydrosalpinx with twisted pedicle and states that the rarity of twisting of a hydrosalpinx is due to the frequency with which adhesions are present which make twisting impossible He also calls attention to the fact that pain is marked while tenderness is relatively slight.

Postoperative Course —The patient made an uneventful recovery without fever the wound healing primarily She left the hospital two weeks after entrance

[1] Auvray De la torsion spontané de la trompe et de l ovaire normaux, Arch. gen. d'obstét. e. d. gyn., July 1912.

[2] H. J Whitacre Hydrosalpinx with Twisted Pedicle Jour Amer Med. Assoc., May 20, 1916, p 1614.

the left deltoid muscle and the temperature rose to 105 2° F In other words he had a metastatic abscess in the subdeltoid bursa on the left side

About three weeks after admission it was found that the entire shaft of the bone was loose separated at its epiphysis both above and below The original wound was still largely open so the shaft was chiseled through at its middle and both fragments easily removed as illustrated by this specimen (Fig 33) It was especially noted at that time that the periosteum was thick and that under it there was a thick layer of new bone Where it was necessary this crust of new bone was separated from the old shaft but none of the new bone was removed After removing the sequestrum there was left a fairly good hollow shaft The leg was then placed in a cast Wound healing was rapid and very satisfactory In about six weeks it had almost completely healed

Fig 32 Specimen illustrating entire diaphysis of tibia necrotic as the result of acute suppurative osteomyelitis

While healing in the leg was progressing favorably conditions were precipitating in and about the left knee of very serious nature About the time of the sequestrotomy the region around the left knee became more and more swollen and painful and a cellulitis developed about the joint It became necessary to incise and drain both the joint and the cellular tissue Incisions were made on each side and drains inserted The boy was in the hospital in all about three months but at the end of that time

tender A diagnosis of acute suppurative osteomyelitis was made and an immediate operation performed

Before speaking of the operation that was done at that time I want to direct your attention to that history This happened in the summer time July 4th These cases usually start with the history that the child was playing violently and injured the leg or the arm or became tired or overexerted while skating and then suffered a trauma becoming sick within twenty four hours with severe pain and chill the chill indicating the infection This happened in the summer there was a slight trauma but no chilling Another thing of interest—there was no previous history of infection to be ascertained He had no tonsillitis no infectious or contagious disease any time previous to the onset of this trouble so we were unable to determine the exact source of the infection It must have come from some focus somewhere but we are unable to determine its location. Taking it altogether we have a very typical history of an acute osteomyelitis which was neglected This case should have been taken care of the second day or better within the first twenty four or forty-eight hours instead of being treated for a week for rheumatism

The operation at that time (in 1910) consisted of an incision that was made throughout the length of the tibia There was pus under the skin and the periosteum was very extensively separated from the bone by the pus In fact the entire length of the tibia had been denuded of its periosteum I chiseled open the medullary cavity and more pus and necrotic tissue were found The wound was left wide open and hot dressings applied The specimen (Fig 32) which I still preserve shows the extent of the infection This specimen shows how a crater was chiseled into the bone and the medullary cavity exposed In a case of this kind I will say it is not necessary to curet actively All that is necessary is to relieve the pressure by a trephine opening or in the more extensive cases to make a large opening in the shaft of the bone That was done here very extensively

The patient was relieved of his pain but the fever continued up to 104° F Ten days after the operation pus developed under

the left deltoid muscle and the temperature rose to 105 2° F In other words he had a metastatic abscess in the subdeltoid bursa on the left side

About three weeks after admission it was found that the entire shaft of the bone was loose separated at its epiphysis both above and below The original wound was still largely open so the shaft was chiseled through at its middle and both fragments easily removed as is illustrated by this specimen (Fig 33) It was especially noted at that time that the periosteum was thick and that under it there was a thick layer of new bone Where it was necessary this crust of new bone was separated from the old shaft but none of the new bone was removed After removing the sequestrum there was left a fairly good hollow shaft The leg was then placed in a cast Wound healing was rapid and very satisfactory In about six weeks it had almost completely healed

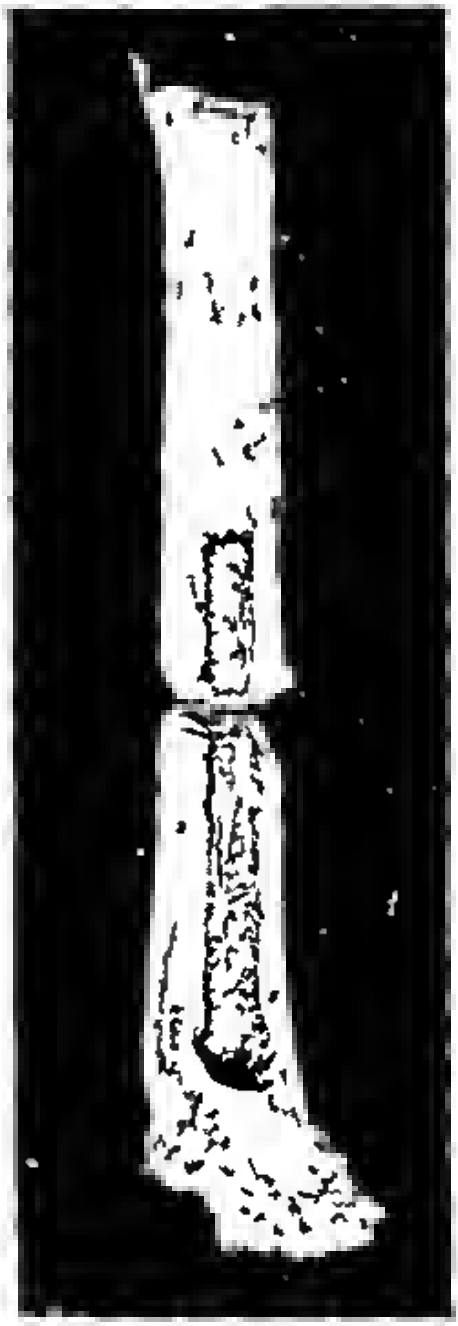

Fig 32 — Specimen representing entire diaphysis of the tibia necrotic as the result of acute suppurative osteomyelitis

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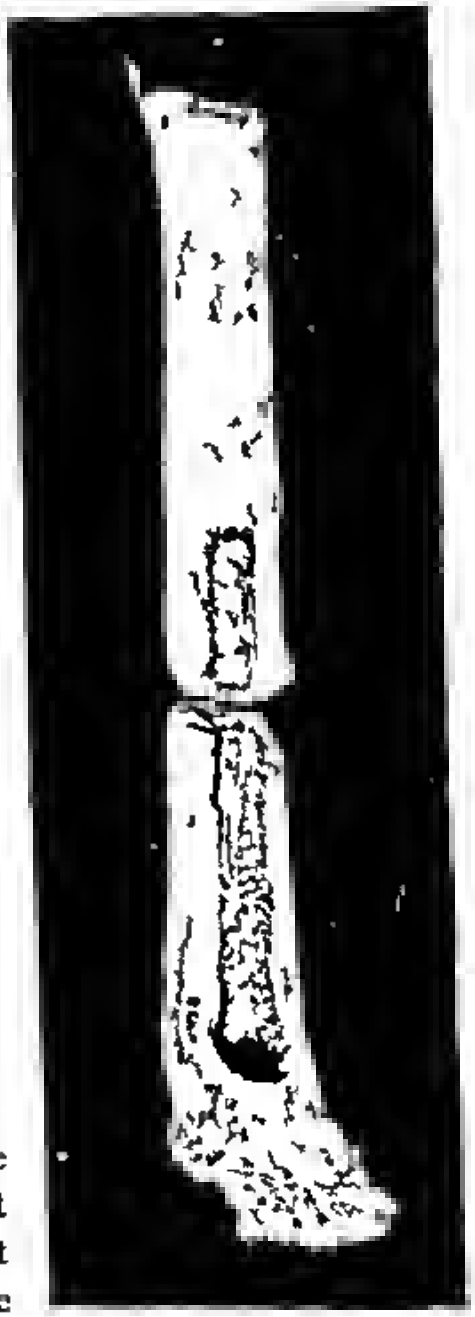

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the wounds were practically all healed Three months after removal of the entire shaft of the tibia he was able to bear some weight on the leg

In regard to this history here we have a boy who gives a history of a slight trauma is immediately taken with chills and fever and exquisite pain Now the question of osteomyelitis is a very similar one to that of acute appendicitis and peritonitis in that it demands the earliest possible operative interference It is lamentable that the medical profession is so lax when it comes to acute osteomyelitis and that they have not learned that a case that gives such a plain history should have immediate operative interference The treatment consists in immediate incision and evacuation of the small focus of pus in the cortex or medulla These clinical symptoms are produced by the lodgment of a small clump of bacteria in the shaft of the bone or in the medullary cavity rarely under the periosteum This starts up a little local abscess which is the cause of the fever chill and pain and the earliest possible evacuation of this pus is imperative The moment an infection located in the bone starts it becomes progressive The infection travels through the Haversian canals and through the cortex until it reaches the periosteum It gets under the periosteum and the periosteum is raised up and is separated from the bone The longer the condition continues untreated the more periosteum is separated and the more rapid and extensive is the necrosis In this case after the duration of a week the periosteum was almost entirely lifted off from the shaft of the bone which was thereby deprived of its nutrition and at the time I operated a week after the onset of the symptoms there was every evidence that the entire shaft was going to become necrotic Therefore of vast importance is the early diagnosis and early operation which is just as important as the early diagnosis and early operation in acute appendicitis If that fact could only be borne in mind by the general profession we would see fewer cases of sinuses and chronic bone disease

Another important phase of this subject is the subsequent treatment and whether it is to be conservative or whether it is to be radical The question arises whether to leave this necrotic

shaft in place and if not when to take it out There is no question that if the necrotic shaft is taken out too early even though it is removed subperiosteally if there had been no development of involucrum, there will be no regeneration I have had that experience and I have seen clinical cases where this occurred and where an extensive plastic operation had to be done later on If this is not done the child is left with a great deformity So in the after treatment of these cases after the primary evacuation of pus it becomes essential to wait until a sufficiently massive involucrum has formed before removing the sequestrum At least no operation should be done under three or four weeks In this case I waited three weeks until a well developed involucrum had formed before I felt safe in removing the shaft of bone Supposing I had not removed the shaft of the tibia at that time but left it alone what would have happened? As time went on the involucrum would have become more massive and thick but sinuses would have persisted and it would have been necessary eventually to go through the involucrum and remove what remained of the necrotic tibia so I think I would not have gained anything by waiting

Finally the boy comes in today with a condition that is rather unusual that is an involvement of the joint adjacent to an osteomyelitis As a rule the epiphysis forms a barrier for the infection and the infection does not drill through and infect the joint In this case the knee joint was infected and the periarticular tissue was involved and drainage was necessary That opens up a question upon which a great deal can be said in regard to septic infection of joints I agree with the teachings of Murphy that *we should not drain a septic joint* A joint that has been drained with rubber tubes will become stiff All the joints that were drained in the old days became stiff joints whereas we have of late years been able to aspirate and inject the infected joints and avoid the occurrence of ankylosis so that infections in the joint should not be drained with rubber tubes but should be aspirated and injected a number of times with 2 per cent formalin and glycerin In this case today owing to the cellulitis in and about the joint it was necessary unfortunately

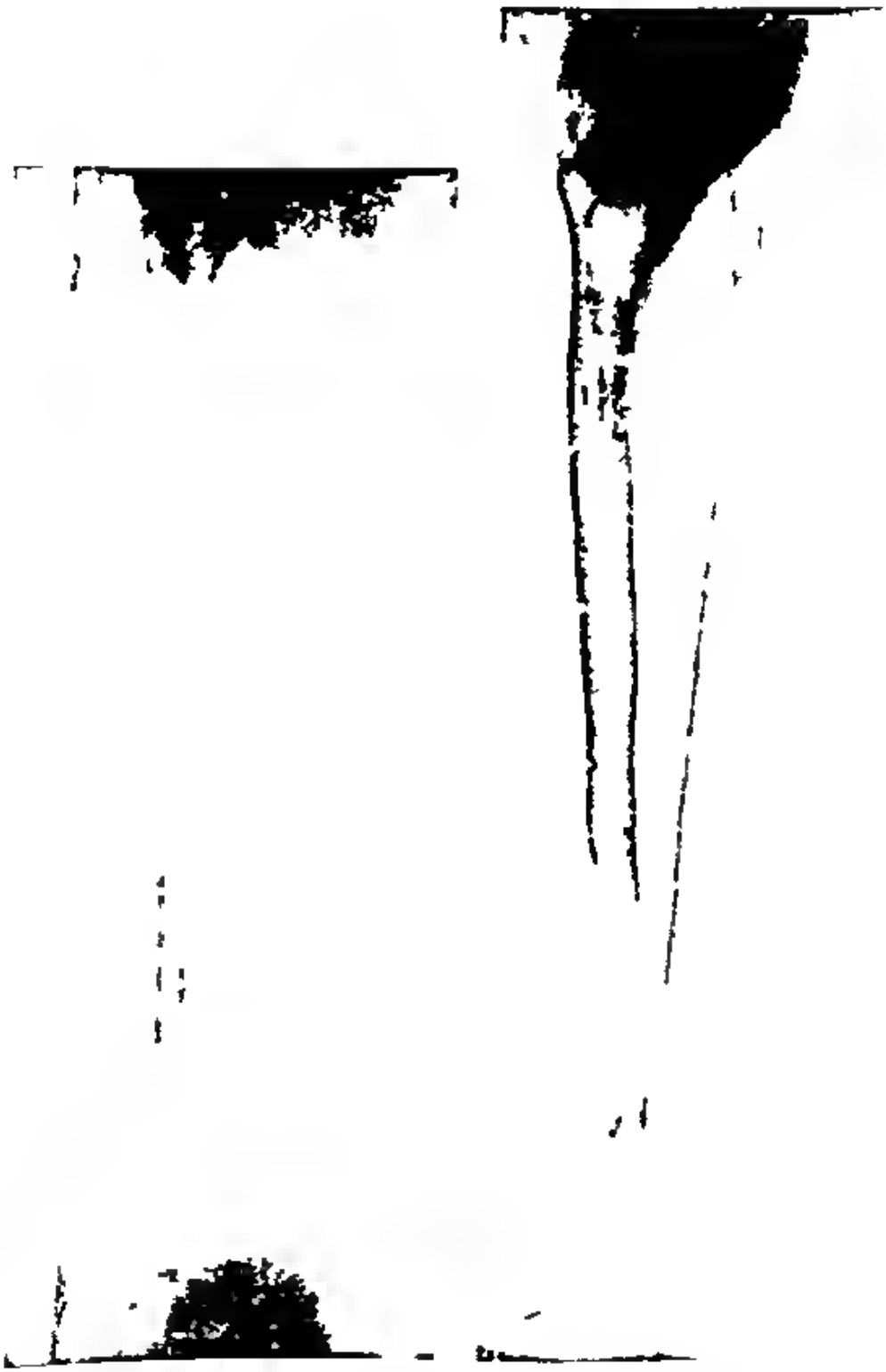

Fig 33.—Appearance of leg after subperiosteal resection of entire diaphysis. A faint shadow indicates deposit of bone under periosteum.

Fig 34.—Same as Fig 33 four months later. The faint shadow of bone has developed a new tibia.

Fig 35—Eight months after sequestrotomy the tibia has reached normal size and function Note lower epiphyseal line preserved Upper one does not show but was destroyed

Fig 36—Traumatic fracture of regenerated tibia a year later Union took place in a normal manner

Fig 35—Eight months after sequestrotomy the tibia has reached normal size and function Note lower epiphyseal line preserved Upper one does not show but was destroyed

Fig 36—Traumatic fracture of regenerated tibia a year later Union took place in a normal manner

to drain with rubber tubes and the inevitable happened In other words this joint became absolutely rigid as is shown by a series of pictures that I have here It took about five or six months for the tibia to regenerate and regain its normal size

This picture shows the condition after the sequestrotomy while the leg was in the cast (Fig 33) It shows just a very faint shadow here which is all that is left A subsequent picture shows the gradual thickening of the shaft (Fig 34) About three months after the operation the boy was walking and within six months the shaft had completely regenerated but as I said the main complication was the involvement of the knee (Fig 35) The next year after he was here he fell and fractured this new bone This regenerated tibia was fractured but it healed up perfectly like an ordinary bone without any trouble (Fig 36) Unfortunately however the boy was left following the osteomyelitis and joint drainage with ankylosis of the knee at an angle of about 130 degrees as I have already intimated While the boy was able to walk and get around very well he was considerably handicapped He comes back and says to me that he is handicapped in his work that he cannot hold his job nobody wants a lame boy and his outlook in life is not at all good He is a bright boy but he is unable to make a living He cannot hold his job for any length of time That is my reason for trying to do something for this boy He comes in with an absolute ankylosis The *x* ray picture shows that condition This is an extreme case of bony ankylosis As you look at the *x* ray picture you see practically no line of cleavage The two are absolutely fused The patella is fused to the anterior surface of the femur (Figs 37 and 38)

Now the problem is to restore that joint In other words if we can reproduce that which happens in the case of a non union of the bone in a fracture we can be more or less successful We realize that success in the knee joint is difficult to obtain Arthroplasty of the knee has not been as satisfactory as arthro-

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ıp is fairly
and next

comes the shoulder and last comes the knee Why is it that the knee joint is so hard to restore? The knee joint is a different kind of a joint from the hip The hip is a ball and socket joint

Fig 37 — Anterior view of ankylosed knee Joint detail almost effaced

and the knee is a hinge joint While the hip is built to bear the weight of the body the mechanical difficulties are not as great as they are in the knee In this arthroplasty we must succeed in restoring motion but that is not enough We must

succeed in restoring to the patient a weight bearing joint. I must be able to make a new joint here that will not only have good motion, but which will be weight bearing and one that

Fig 38.—Lateral view of ankylosed knee joint. Patella is fused to femur. Note bony union between femur and tibia. Bones display the rarefying osteitis of disuse.

will be plumb and useful. If I cannot do that the boy will be better left alone. More cases of successful arthroplasty of the hip and elbow are reported than of any of the other joints. The

best of operators have had good cases and have had bad ones They have had cases in which the ankylosis recurred so that we realize the very serious problem before us

What do we propose to do? What are the successive steps of the operation? First we will make two lateral incisions any where from 5 to 7 inches long on either side of the patella Then we will have to chisel the patella loose from the femur Then we will make our flaps consisting of fascia and capsule There is no synovial membrane here We will make fascia and fat flaps and interpose them between the bones Then we will have to chisel the tibia from the femur using a special set of curved chisels in order to preserve the convexity of the femur and the concavity of the tibia Then we will have to remove enough bone from the tibia to enable us to straighten the leg bearing in mind that the placing of too great tension on the tissues in the popliteal space is fraught with imminent danger If we straighten that leg too forcibly and put too much tension on the popliteal vessels we are liable to get necrosis of the leg and not only will the leg be hazarded but even the patient s life We have a thousand minor details to think of in the performance of this operation After separating these bones and loosening the patella and making our flaps the flaps will be interposed between the tibia and patella and the patella and the femur The disposition of the patella will have to be settled after we get in Possibly we will turn the patella completely around through an arc of 180 degrees You know the upper surface of the patella is covered by fascia and aponeurosis and by turning it once around it brings that fascial plane in contact with the femur We must absolutely avoid the recurrence of adhesions between the patella and femur After removing all the projecting spiculæ of bone we smooth off the bone surfaces As you know we will sacrifice the lateral ligaments You will say are you taking away the entire ligamentous supports? We are going to remove the crucial ligaments if necessary Possibly we will not be able to identify them We will also remove the lateral ligaments Some oper ators remove the posterior part of the capsule though I am not in favor of it We must bear in mind the location of the external

popliteal nerve as it goes around the head of the fibula, so as to avoid injury of this important structure So you see the proposition is very complex. Upon what are we going to depend, then for stability? If we remove the lateral ligaments and remove the crucial ligaments what is going to make that joint stable afterward? Are we going to have a flail joint? No we are not. It is remarkable how the ligaments will regenerate, especially after the joint is put to use We have all seen cases of non union in fractures where there was joint capsule cartilage and synovial membrane. In other words, there was a complete joint regeneration because motion occurred at the site of the fracture If a joint like this is put to use the external ligaments and the ligamentous attachments will regenerate. That has been the observation of the men who have done this line of work, but we depend to a large extent upon the preservation of the intercondyloid ridge and the tubercles of the tibia in preventing lateral displacement. The leg must also be made absolutely plumb so that when the patient stands the axis of the limb will be normally preserved. If there is too great an angle outward or inward it is going to cause tension on either side so you see we have got to do a mechanically perfect job We have got to get this leg plumb even though we remove the capsular ligament, and in order to do that we must preserve the intercondyloid ridge of the tibia That will prevent lateral displacement. After completing that part of the operation the leg is extended and a Buck's extension of 15 to 20 pounds is placed on the leg and kept on for a month at least to prevent the muscles of the leg from contracting that is, to prevent the hamstrings and the quadriceps from pulling up against the transplant and pressing the transplant between the tibia and the femur If the transplant should become atrophied and necrotic, we would get a recurrence of the ankylosis. It is absolutely necessary to apply a Buck's extension for at least a month. At the end of a month very gentle passive and active motion is started and the patient is allowed after several weeks more to get up but not to put much weight on the leg for at least two months. Violent active or passive motions are not good They tend to traumatize the joint

There is one more point Shall we use a free transplant or a pedicled flap? Now both plans have been tried and while it is the tendency now to use the free flaps of fat and fascia I believe the experience has been and it has been Murphy s experience, that the pedicled flap after all is better than the free flap I will use a pedicled flap with the pedicle downward or upward—it does not make much difference—and overlap the flaps in the midline This will probably be better than a transplant I think it will have more thickness and will be less likely to atrophy than a transplant in this region

So much then for the present condition and our plan of operation We will now proceed with the operation

Operation —Now as to the preparation of the patient This boy s limb was shaved yesterday morning and a green soap dressing put on until last night Last night that dressing was removed and the limb was thoroughly scrubbed and treated with alcohol and McDonald s solution We have been using McDonald s solution in this operating room for several years with great satisfaction I will not say that the results have been better than with iodin but it has one advantage over iodin in that it is not so irritating I have seen a number of cases of dermatitis produced by iodin Another thing is that the solution can be applied on a wet surface which is not the case with iodin Iodin cannot be used on a wet surface the skin must be dry At times the skin cannot be kept dry so in that case the iodin is not efficient Iodin will not penetrate the skin cells that have absorbed moisture Iodin is not at all miscible with water so with iodin it is an absolute necessity that the skin be kept dry McDonald s solution can be applied to a wet surface I am very partial to this solution We use it as a routine in all cases where we would ordinarily use iodin

It is perfectly obvious that this knee is completely ankylosed at an angle of 130 degrees You see the old scar on the anterior surface of the tibia You see the scars on the inner and outer surfaces of the region of the knee joint These represent the drainage openings that were made when the boy had his infection of the knee Owing to the rigidity of the knee and lack of use

of the muscles on this side there is a difference in the circumference of the two legs of about 1½ inches Another point of importance that has not been brought out yet is this that owing to the involvement of the upper epiphysis of the tibia by the infection burrowing through the epiphysis into the joint the epiphysis was disturbed and the epiphyseal cartilage was more or less destroyed and the growth of the leg was retarded so this tibia is 1½ inches shorter than the other one That is unfortunate because even after we have succeeded in straightening the leg it will still leave this leg 1½ inches shorter than the other one but I feel certain that if I can restore motion to this rigid joint we will have done this boy incalculable benefit

Now we have very carefully applied the McDonald solution to the leg thigh and knee The question of using a constrictor arises. Sometimes one does and sometimes one does not. I am not going to use a constrictor here I do not think we will have very much bleeding I dislike putting on a constrictor for too long a time Of course a constrictor can be left on for an hour or an hour and a half with perfect safety but with a constrictor left on for a long time for one and a half hours or more there is likely to be some disturbance of the nutrition of the part and there is likely to be more postoperative oozing than there would be otherwise Now it is almost needless to say that in the performance of this operation we exercise extreme care in following out the non-contacting proposition I might call it the Lane technic the avoidance of touching the wound with the fingers or touching any instruments that go into the wound or touching any part of the instrument that subsequently goes into the wound That principle has to be observed from beginning to end especially in bone cases but of course it should be observed in all operations If in all our operations we followed out that principle we would have little if any infection but especially is that true in the bone operations The sponges are not picked up with the gloved hand but are picked up with forceps

We will make the outer incision a curved one about 7 inches long extending somewhat above the patella and below the tuberosity of the tibia (Fig 39 *A*) I could make a horseshoe flap with

the convexity upward or downward, but experience has shown that these flaps are very prone to become necrotic, which is a very undesirable complication Now we are separating and undermining our skin flap from each side so as to expose the tissues and structures beneath We have in view now the outer aspect of the knee and the external lateral ligaments I shall now make mental measurements of the size and location of the external lateral flaps, which ordinarily should be about 2 or 2½ inches wide at the base and 2 to 2½ inches long I am determining now the junction of the tibia and femur with my forceps The base of this flap is going to be a little bit beyond the margin of the external tuberosity Here is the ligamentum patellæ We will not disturb that As I said before, in fashioning this outer flap we go through to the bone catching the fascia and all the tissues down to what is called the synovial membrane Now I am fashioning the outer margin of the flap Unfortunately there is no fat here at all Now I am dissecting this outer flap from above downward taking all the tissues down to the lateral aspect of the femur This dissecting back of the flap is about as difficult as though we were dissecting back the periosteum There goes one of the articular branches You always want to make your flaps larger than you think you want them to be especially when you are making free flaps It is wonderful how they shrink in size It is like making flaps for an amputation—always make large thick skin flaps and they will always be right We have dissected the flap with the base down about ¾ inch beyond the junction of the femur and the tibia (Fig 39 2)

Now I make an incision on the outer side of the knee through the lateral extension of the biceps so as to expose the patella because we must expose the patella in order to chisel it loose from the femur but preserving the ligamentum patellæ It is utterly impossible to separate the patella from the femur with a scalpel As you see in the *x* ray picture there is absolutely a bony fusion In fact there is a fusion of everything There is scarcely anything left that you can determine as to its identity

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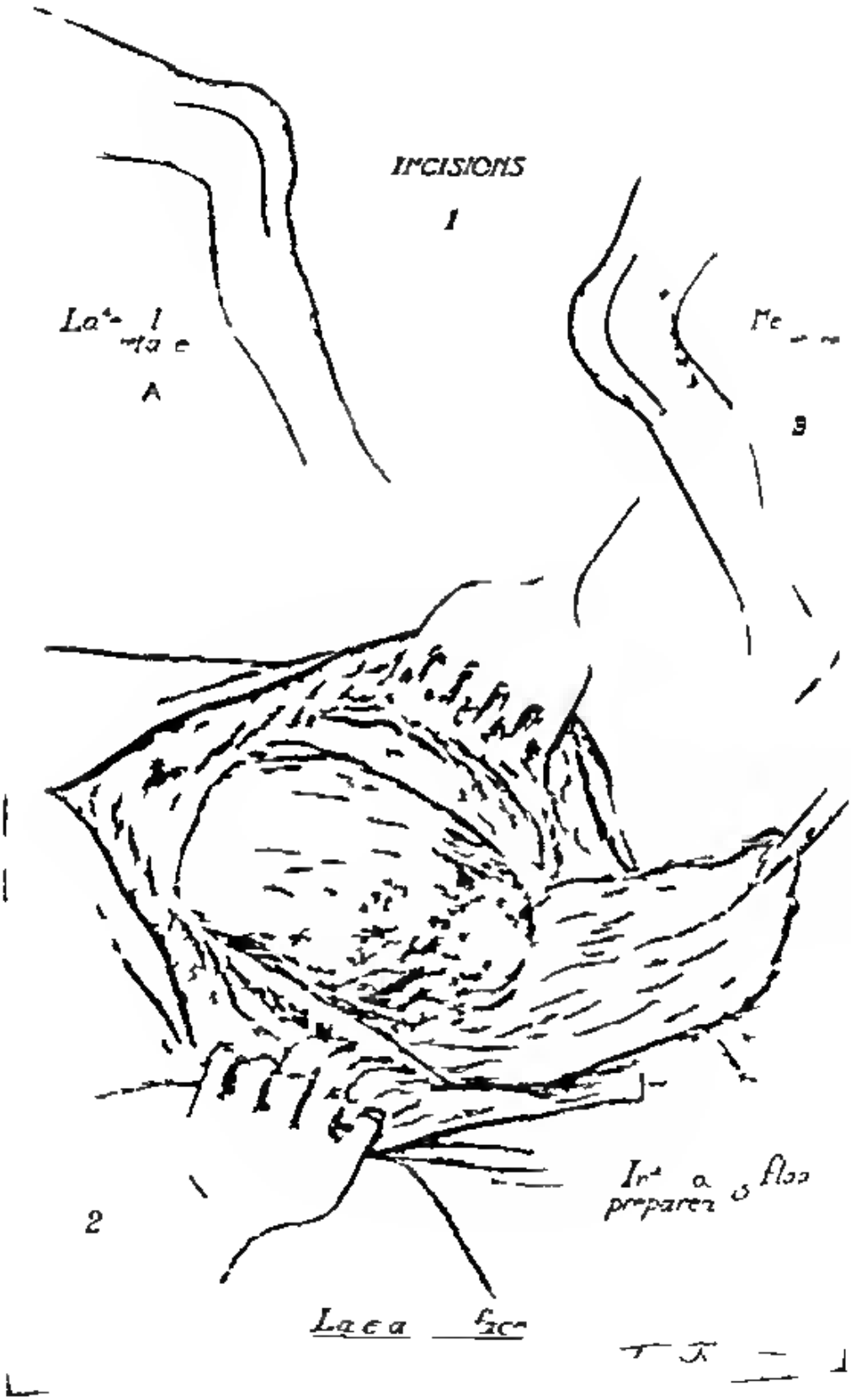
Now we will go to the other side We will fashion our flap over there before we loosen up the patella We will make an in


INCISIONS
1
A
3
2

cision on the inner side, starting below and behind the tuberosity of the tibia and carrying it up above the patella so that the old scars do not come in (Fig 39 *B*) We readily separate the skin from the underlying surface Now let us see where we are going to fashion our flap on the inner side We will start about ¾ inch below, bearing in mind the location of the patella and bringing our incision up about 2½ inches Now we start dissecting down keeping close to the bone as before We make an incision beginning above the patella and loosen up the patella Then we will be ready in a moment to chisel the patella loose This is anything but easy, because the patella is very firmly united to the anterior surface of the femur First we will loosen it up from the outer side and then we will proceed from the inner side Now I have the patella loosened so I can get the chisel under it all the way across Now we proceed to the separation of the tibia from the femur We first determine the margin of the tibia here We are retracing the tendon of the patella inward Now using a curved chisel I am going to proceed to loosen up the outer condyle endeavoring all the time to preserve its round contour That is why I am using a curved chisel Now on the inner side we will do the same thing to determine the junction of the tibia and femur and separate them In some favorable cases of ankylosis the tibia and femur are ankylosed only for a short distance but as you will see in this *x* ray picture the bones are adherent over a very wide surface and require very wide chiseling apart The dangerous place is the popliteal space There is no sign yet of this giving We have not yet succeeded in chiseling it off enough You will agree that this is anything but an easy task in the face of such an extensive ankylosis (Fig 40 3) Now we have it loosened Now we must be extremely careful not to make any violent efforts at extension because we have our popliteal vessels on tension I think before I make any attempt at extension I will cut away more of the tibia bearing in mind that I want to preserve the intercondyloid ridge I will take off 1½ to 1¾ inches of the

Fig 39—1 Incisions on the inner and outer aspects of knee 2 Wound shown retracted The quadrilateral interposing flap has been dissected off close to the bone with its base downward

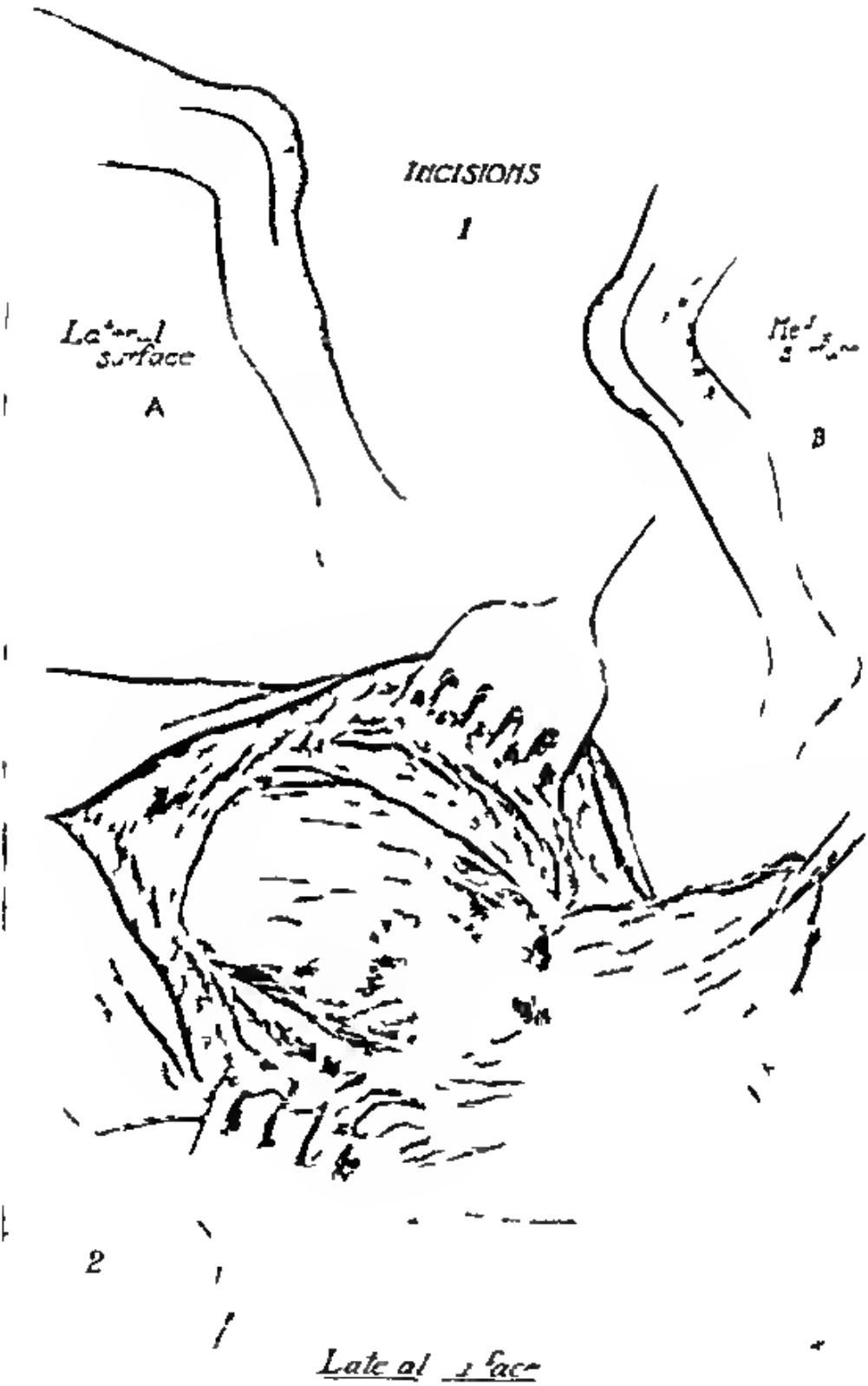


Fig. 39

cision on the inner side starting below and behind the tuberosity of the tibia and carrying it up above the patella so that the old scars do not come in (Fig 39 *B*) We readily separate the skin from the underlying surface Now let us see where we are going to fashion our flap on the inner side We will start about ¾ inch below bearing in mind the location of the patella and bringing our incision up about 2½ inches Now we start dissecting down, keeping close to the bone as before We make an incision beginning above the patella and loosen up the patella Then we will be ready in a moment to chisel the patella loose This is anything but easy because the patella is very firmly united to the anterior surface of the femur First we will loosen it up from the outer side and then we will proceed from the inner side Now I have the patella loosened so I can get the chisel under it all the way across Now we proceed to the separation of the tibia from the femur We first determine the margin of the tibia here We are retracting the tendon of the patella inward Now using a curved chisel I am going to proceed to loosen up the outer cond[illegible] endeavoring all the time to preserve its round contour That is why I am using a curved chisel Now on the inner side we will do the same thing to determine the junction o[illegible] the tibia and femur and separate them In some favorable cases [illegible] the tibia and femur are ankylosed only for a short [illegible] as you will see in this *x* ray picture the bones are [illegible] a very wide surface and require very wide chiseling [illegible] dangerous place is the popliteal [s]pace There [illegible] this giving We have not yet succeeded in chiseling [illegible] You will agree that this is anything but an eas[y] [illegible] such an extensive ankylosis (Fig 40 3) [illegible] ened Now we must be extremely careful [illegible] efforts at extension because we have o[illegible] [illegible] I think before I make any attempt at [illegible] I will [illegible] away more of the tibia bearing in mind that I [illegible] the intercondyloid ridge I will take off [illegible]

Fig 39 —I Incisions on the [illegible] and [illegible] wn retracted The quadriceps [illegible] been with its base downward

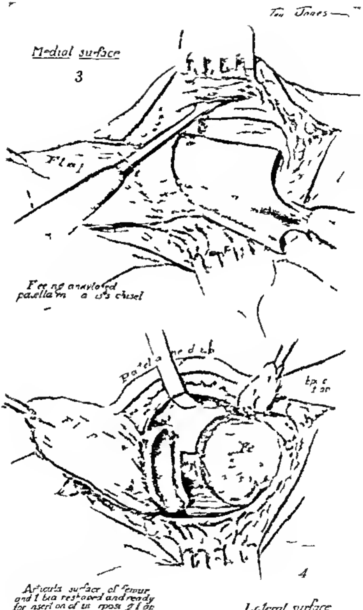


Fig 40

and the joint does not have to be disturbed to such an extent. Here we had to take off so much of the tibia in order to get flexion. It is not enough to get extension, but we must get flexion. As the doctor makes traction here, you see there is a nice separation of the bones. This drainage is put in to carry away the oozing. There is considerable oozing, but we would have had the same oozing had we put on a constrictor. The dressings are now applied. We will put on a posterior splint and tomorrow we will put on a Buck's extension.

ADDENDUM

The prolonged anesthesia and the hemorrhage resulted in considerable shock to the patient, but he responded nicely to hypodermoclysis and intravenous injections of digalen. After the immediate danger of the operation had been overcome, there remained two further factors which were the source of the greatest anxiety to the operator. The first was the condition of the external popliteal nerve and the possibility of its having been injured during the operation. The second was the state of nutrition of the leg. While the position of the nerve was constantly kept in mind, it was still possible that it might have suffered injury or been severed entirely. The resulting paralysis, especially if permanent, would be almost, if not quite, as bad as the original trouble. As to the second point, Everyone knows that in straightening out a knee joint which has been fixed in flexion for years, with the popliteal vessels in all likelihood surrounded by scar tissue, there is danger of narrowing the lumen of the vessels sufficiently to cause temporary embarrassment of the circulation or even gangrene of the leg.

The terrible suspense was ended next morning, when, to our great joy, it was noted that not only was the circulation of the foot perfectly normal, but voluntary motion was also possible in

Fig. 41.—5. All flaps except the lateral patellar have been sutured in place. Note the space still existing between the bones and the [illegible] There is no tissue with which to reconstruct lateral ligament. 6. Final appearance before closure of wound. [illegible] Schematic anterior-posterior view [illegible] contour of reconstructed joint with its interposed cushion of transplant.

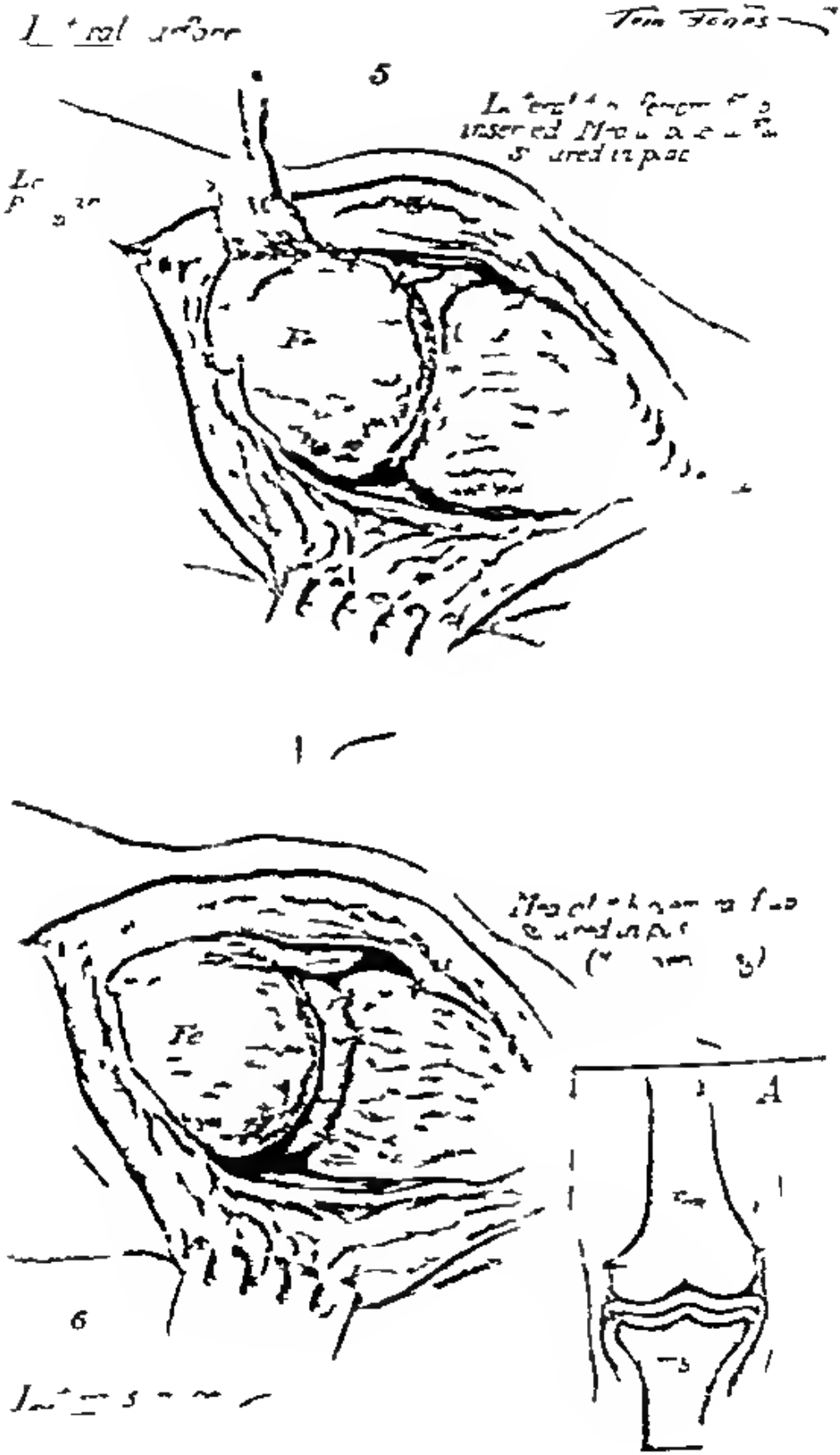


Fig 41

all directions There had been considerable pain which was al most in tantly relieved when the extension was put in service. There was also quite a bit of bloody oozing but the drains could be di pensed with after the fifth day The wound healed by primary intention ehminating the third and not the least source of danger—infection

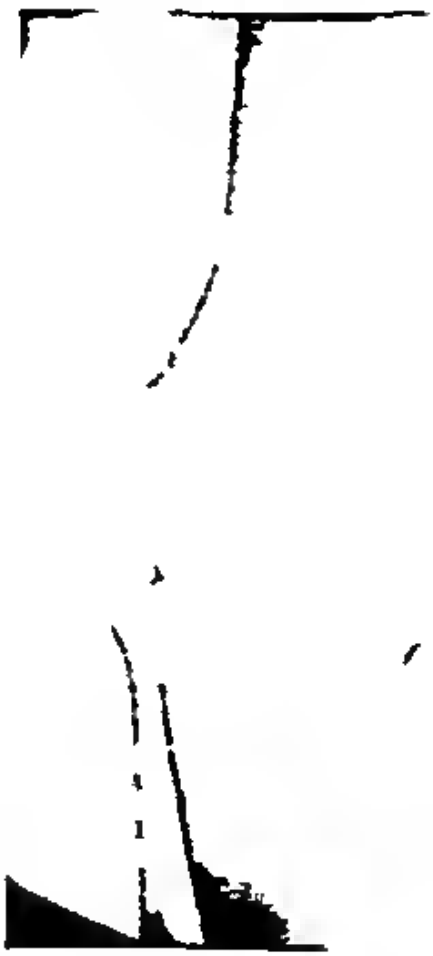


Fig 42 — Arthroplasty for bony ankylosis of the knee soon after operation. Anterior view shows perfect adaptat on of the remodeled bone end Position of head of fibula gi es an idea of the amount of tissue remo ed. Note that the lon, axis of the leg is truly preserved.

The exten ion was maintained for four weeks during which time the patient wa entirely comfortable and moved his knee-joint voluntarily After a month in bed the boy was about the ho pital on crutches for a month longer receiving massage and gentle passive motion At the time of his discharge from the

hospital two months after operation his condition was as follows

Extension passive and active is complete and free From the extended position flexion is possible actively for about 60 degrees, the leg can be bent passively a little further A very important feature to which especial attention is directed is the fact

weakness whatever The boy can walk fine without crutches, although advised not to discard them for a while yet. The joint is so strong and firm that no support or bandage whatever is worn.

The patella is fairly movable and shows no inclination to readhere to the femur It is not unlikely that as time goes on there will be more improvement in the way of flexion but even if such should not be the case it can safely be asserted that the success and improvement thus far attained have justified the formidable and hazardous operation to which this patient was subjected

CLINIC OF DR DAVID C STRAUS

Michael Reese Hospital

ACUTE ILEUS CAUSED BY THE APPENDIX ADHERENT TO THE RIGHT OVARY

Summary Etiology diagnosis and treatment of mechanical ileus—differentiation from ileus of other types—cases for medical management—when surgery is indicated operative technic—how to locate the point of obstruction—the question of drainage of obstructed loops after care secondary paralytic ileus—management frequency of ileus due to the appendix acting as the constricting agent

May 17 1917

This patient, a Russian housewife forty four years of age, was brought to the hospital at 8 P M last night because of severe cramps in the abdomen, associated with vomiting and obstipation The cramps began suddenly about 5 P M the day before yesterday, Tuesday, May 15th and were soon followed by repeated vomiting In all she vomited about fifteen times before her entrance into the hospital She had her last bowel movement Monday afternoon and this was the result of having taken Epsom salts on Sunday Although she has been somewhat constipated for some time there has never been anything peculiar about her stools, which have been formed and of normal caliber Since the onset on Tuesday the cramp-like pains and vomiting have continued up to the present time The pain has been severe all over the abdomen, though it is most severe in the epigastrium She has had a chronic productive cough for several years but of late she has felt as well as usual and has not had any abdominal distress The present acute abdominal symptoms came on suddenly, without warning In this connection her past history is of interest

At the age of eighteen she had a laparotomy performed to remove a tumor from the right iliac region Subsequently a second operation was done for the same condition Both of these operations were performed in Russia

The patient has been at this hospital on two previous occasions The first time was four years ago when in August, 1913 she entered the service of Dr Ludwig Simon and was delivered of a normal child This was her seventh normal pregnancy Her previous history recorded at that time was entirely negative except for the two laparotomies mentioned before The labor which lasted one hour and forty minutes was uneventful No anesthesia or other medication was administered. Just following delivery the patient became markedly dyspneic and felt faint She began to cough somewhat but not a great deal The cough which she dates from this time has never left her During the rest of her stay in the hospital she had severe attacks of dyspnea with profuse sweating and was quite weak A von Pirquet test was made and gave a positive reaction in twelve hours Dr Joseph C Friedman saw the patient in consultation and made a diagnosis of pulmonary tuberculosis When she was discharged from the hospital in September she was advised to wean the baby because of her pulmonary disease

She was not seen again until eighteen months later when she re-entered the hospital in January 1915 on the service of Dr Lester E Frankenthal because of pain in the lower abdomen that had begun eight weeks before and dated from the time of her last menstrual period Her menstrual history was otherwise normal She also complained of a chronic productive cough. This she dated from the time of her last pregnancy as mentioned before There had been no hemoptysis She gave a history of a slight evening rise in temperature night sweats and loss of appetite but she did not believe she had lost weight.

Examination showed that the patient was two months pregnant, but nothing abnormal in the abdomen or pelvis Dr Friedman was asked to examine the patient in regard to her lung condition and he made a diagnosis of fibroid phthisis There was dulness over both apices and over the upper portion of the

nght lower lobe, posteriorly There were crepitant and sub crepitant râles over these areas of dulness The sputum was examined repeatedly, but no tubercle bacilli were found, only pneumococci, staphylococci, and streptococci

As you no doubt well know, pulmonary tuberculosis is aggravated by pregnancy, and if active is therefore an indication for the induction of therapeutic abortion and the prevention of subsequent pregnancies On this indication, Dr Frankenthal emptied the uterus and, in addition through a low abdominal incision, ligated the fallopian tubes The operative record shows that on January 23 1915, under gas-ether anesthesia a low median abdominal section was made and the fallopian tubes were exposed and both treated in the following manner After doubly ligating the tube a short distance from the cornu of the uterus the tube was divided between the two ligatures the layers of the broad ligament separated, and the proximal end of the divided tube was buried in the broad ligament and covered over by peritoneum The abdomen was then closed Finally the uterus was curetted and the cavity irrigated with ½ per cent tincture of iodin Histologic examination of the tissue from the curetage showed this to be decidual and placental tissue The patient made an uneventful recovery and was discharged at the end of three weeks

Since her discharge from the hospital in February 1915 nothing further has been seen of the patient until last night when at 8 P M she was admitted to the medical service of Dr Friedman with the typical history and symptoms of ileus as mentioned in the beginning of the history

Examination showed her to be a rather emaciated woman, suffering great abdominal pain and apparently very ill Her cheeks were flushed and her expression anxious Otherwise examination of the head and neck showed nothing of interest Examination of the chest showed impaired resonance and harsh breath sounds over both apices and over the upper portion of the right lower lobe, posteriorly, but no râles The heart was normal The abdomen was somewhat distended and meteoristic In the right lower quadrant there was considerable bulging in the

long, wide, but rather shallow incisional hernia, which has developed in the scar of one of the old laparotomies for the tumor in the iliac region The picture was as you see it now, only with this difference At that time visible peristaltic waves could be seen to pass from left to right across this prominent bulging in the right lower quadrant of the abdomen The abdomen was diffusely tender on pressure throughout, but there was no rigidity No abdominal tumor was palpable Examination of the nervous system was negative The temperature was 101.2° F, pulse 104, and respirations 24

A diagnosis of ileus was made and she was at once given a soapsuds enema This was expelled clear, without any fecal matter Later in the evening she was given $\frac{1}{75}$ grain of atropin, hypodermically During the evening she vomited a foul-smelling fluid, which was described as being fecal in character At 10 o'clock she was given a milk and molasses enema. This also was expelled clear, though some flatus was passed At midnight the temperature was 100.8° F rectally, pulse 104 and respirations 24 The patient slept fairly well during the night. At 2 A. M. she received a second hypodermic of atropin (gr $\frac{1}{75}$) Early in the morning she was given a second milk and molasses enema This again was expelled with a small amount of flatus, but no bowel movement She continued to vomit. The leukocyte count was 12 000 The blood pressure was 115 systolic and 72 diastolic. A morning specimen of urine showed an acid reaction, a trace of albumin no sugar casts or acetone, 15 to 20 white blood-corpuscles and 3 to 6 red blood-corpuscles to the high power field.

At 9 A. M. Dr Friedman examined the patient fluoroscopically, but without introducing any bismuth This seemed to confirm the clinical findings—that the obstruction was probably in the lower ileum—but the examination was not entirely satisfactory However, as Dr Friedman believed there was no question but that the patient was suffering from ileus and that this required surgical care he transferred the patient to the surgical department.

When I first saw the patient at 9.30 this morning the findings

were about the same as those described in the record of the medical department, except that visible peristalsis was no longer to be made out That the patient was suffering from ileus was beyond question The fact that visible peristalsis had been seen in the right lower quadrant of the abdomen shows that the obstruction must be below this point, that is, either in the lower ileum or in the large intestine In order to rule out the possibility of the obstruction being due to a malignant neoplasm of the large intestine I carefully questioned the patient in regard to the frequency and nature of her bowel movements From her statements it was clear that she had been more or less constipated for some time, but this had not been progressive, and had not increased of late, and her stools were formed and of normal caliber She was positive in her statements that she had not had the narrow lead pencil like stools so suggestive of organic obstruction due to annular carcinoma

In order absolutely to exclude the possibility of the obstruction being in the large intestine I have just examined the patient fluoroscopically, giving her a bismuth enema, and watching the enema enter the colon The bismuth was seen to pass through the entire large intestine as far as the ileocecal valve without meeting any obstruction and without showing the presence of any filling defect This shows that there is no obstruction in the large intestine, and, therefore, by exclusion, the obstruction must be in the small intestine

Having determined this I was particularly interested to learn where her pain was most severe, and I have just questioned her carefully in regard to this She insists that the pain is most severe in the midepigastrium though she says it is almost as severe all over her abdomen It is not more severe on the right side than on the left, and is not as severe in the right lower quadrant as it is in the epigastrium

In ileus the site of the obstruction cannot at all be determined by the area in which the pain is felt In obstruction located in the small intestine the pain is usually most severe in the region about the umbilicus and also often in the epigastrium, as in this case Even when definite unilateral distention and

local meteorism is present as in this case it is only rarely that the pain is localized on the affected side and is unilateral In ileus of the large intestine the location of the pain varies depending upon the portion of the gut that is distended If the transverse colon is distended most of the pain is localized in the upper abdomen When the obstruction is in the lower part of the descending colon the pain is located in the left side of the abdomen When the sigmoid is distended the pain is usually similar to the pain due to obstruction in the small intestine and is similarly referred to the region of the umbilicus or in the small of the back.

Having satisfied ourselves that the patient is suffering from an obstruction in the small intestine it still remains to determine whether the obstruction is *mechanical* or whether it is due to a *localized spasm* or to a more or less localized *paralysis* of this portion of the gut *i e* whether the patient is suffering from mechanical ileus dynamic ileus or adynamic ileus.

When we consider that the patient has had three laparotomies and therefore probably has adhesions and when we consider further that her symptoms came on suddenly and followed the use of a drastic cathartic, which by setting up violent peristalsis causes various loops of bowel to change their position more or less it is logical to suspect that we have to do with a mechanical type of ileus caused by an adhesion.

We must, of course consider all the other causes and varieties of ileus in order to exclude them In order to do this systematically it is well to have some classification in mind though it is needless to say that there may be a combination of causes in any given case and no classification has yet been suggested which is beyond criticism. Some classification such as the following which is a combination of several which have been proposed is useful for clinical purposes

ILEUS—VARIETIES AND ETIOLOGY

MECHANICAL

A. *Strangulation* [1]

1 All varieties of external strangulated hernia
- Femoral
- Inguinal
- Umbilical
- Ventral
- Obturator
- Ischiadic
- Perineal
- Lumbar
- Vaginal

2 Internal hernia
- (*a*) Into the various peritoneal pockets
  - Fossa duodenojejunalis
  - Parajejunal
  - Fossa cæcalis inferior
  - Fossa cæcalis and subcæcal s
  - Hernia into the Douglas pouch
  - Hernia retroperitonealis anterior
  - Intersigmoid hernia
- (*b*) Through the foramen of Winslow
- (*c*) Diaphragmatic hernia
- (*d*) Apertures
  - Congenital or acquired slits (operations) in the mesentery, omentum broad ligaments, etc

3 Adhesions and bands

4 Diverticula Meckel s diverticulum

B *Angulation*
- Adhesions
- Bands
- Operations

FUNCTIONAL

Aperistaltic (Adynamic paralytic)

1 General or local peritonitis

2 Embolism and thrombosis of superior mesenteric vessels

3 Uremia

4 Chronic drug poisoning

5 Reflex ileus
- Torsion of mesentery
- Torsion of pedunculated tumors
- Pancreatitis
- Extraperitoneal abcess
- Intra abdominal hemorrhage
- Ulcerative enteritis
- Strangulation of omentum
- Ovary or testicle
- Hepatic colic
- Renal or ureteral colic
- Trauma
- Ovarian compression
- Diaphragmatic pleurisy

6 Operations on mesentery

7 Spinal cord lesions

8 Afferent nerve lesion

9 Prolonged mechanical ileus

Hyperperistaltic (Dynamic spastic)

1 Lead poisoning

2 Tyrotoxicon poisoning (ptomain poisoning due to stale milk, cheese, or ice cream)

3 Hysteria

[1] In this classification the term is used in the broad sense and not in the strict pathologic sense although many of these cases do go on to strangulation in the strict pathologic sense This is one of the objections to this classification

ILEUS—VARIETIES AND ETIOLOGY

MECHANICAL	FUNCTIONAL
C. *Compression*	
Neoplasms (extrinsic)	
Displaced organs.	
Superior mesenteric vessels.	
Inflammatory and other exudates.	
Foreign bodies.	
D *Obturation*	
Strictures from cicatrix.	
Neoplasms (intrinsic)	
Foreign bodies.	
Gall-stones.	
Fecal impaction.	
Worms.	
E. *Intussusception*	
F *Volvulus*	

There is nothing in the history or the physical findings to make us believe that we have to do with a hyperperistaltic (dynamic spastic) type of ileus for there is no evidence of lead poisoning and the negative history and the fact that the patient so completely purged herself just before the onset of the ileus rules out tyrotoxicon poisoning

The fact that visible peristalsis was to be seen when the patient first entered the hospital would lead one to believe that the original cause of the ileus was some mechanical obstruction rather than a more or less localized absence of peristalsis such as occurs and is the cause of the obstruction in the aperistaltic (adynamic, paralytic) type of ileus However the fact that visible peristalsis was present does not necessarily rule out paralytic ileus for in cases of paralytic ileus there may be increased peristalsis in the loops just proximal to the area paralyzed Furthermore an ileus primarily paralytic, may be complicated by angulation with resulting mechanical ileus—*i e* combination forms occur There is however in this case nothing in the history or the findings that suggests any of the conditions that cause aperistaltic (adynamic, paralytic) ileus all of which I have carefully considered.

There are certain peculiarities in the symptoms occurring in mechanical ileus which are often of aid in making the differ

ential diagnosis between mechanical ileus and the other two forms

In mechanical ileus there is always pain and this is characteristically recurrent and colicky in type This is soon accompanied by vomiting The vomiting in mechanical ileus tends to increase both in frequency and particularly in amount the longer the obstruction continues because the vomiting is due to the stagnation and backing up of fluids and food ingested mixed with the intestinal and gastric secretions In the other two varieties of ileus the vomiting in general tends to diminish the longer the time from the onset This is explained by the fact that in functional ileus the vomiting is largely reflex in nature and tends to diminish progressively

In mechanical ileus when the obstruction is low down the amount of fluid vomited is sometimes enormous In general the lower down the obstruction the greater the amount of fluid vomited The higher the site of the obstruction the less is the amount vomited and one must not forget that in case the obstruction is near the stomach as in gastromesenteric ileus the amount of fluid vomited may be very small although it is characteristic in that it consists of practically nothing but gastric secretion

In an uncomplicated case of mechanical ileus fever is never present primarily As a general rule the presence of fever and leukocytosis speaks against mechanical obstruction and suggests some other cause for the ileus usually some inflammatory condition in the abdomen associated with peritonitis or some inflammatory condition associated with reflex ileus This is a very important point in diagnosis and one that should never be forgotten

One occasionally meets with a case of mechanical ileus in which a careful history and physical examination will disclose the fact that the patient has some associated or complicating condition present For example in this case the fever and leukocytosis can be easily accounted for by the lung findings Of course this does not rule out the possibility that the ileus may be due to some inflammatory condition in the abdomen but there

is nothing in her history to make one suspect local or general peritonitis

Considering all these facts which suggest that the ileus is mechanical and in view of the absence of anything in the history or findings which would suggest that the ileus is due to any of the conditions which produce functional ileus *i e* aperistaltic (adynamic paralytic) or hyperperistaltic (dynamic spastic) ileus and *since medical treatment has given no relief* I feel that operative interference is indicated

Let us briefly recapitulate the evidence we have that suggests that the ileus is mechanical. The fact that the patient has undergone three laparotomies makes it probable that she has some adhesions Except for her lung condition with its chronic productive cough she has been perfectly well up to the moment of the sudden onset of the severe colicky pain Her vomiting followed this. The absence of any previous abdominal pain vomiting or any history of renal colic gall-stone colic or the like is striking The fact that the vomiting since its onset has been progressively increasing is significant, as is also the fact that visible peristalsis has been present. Finally the failure of thorough medical treatment, added to all the other evidence makes the indication for surgery absolute While it is impossible to say positively that the obstruction is mechanical, the great probability is that such is the case

Considering the various possibilities as to the nature of the mechanical obstruction we can only say that no external hernia are to be made out except the incisional hernia. This is so broad that it seems improbable that it is the cause of the obstruction. The presence or absence of the various other conditions which come into consideration can only be determined at our exploratory operation

Now that the patient is anesthetized we will proceed to the operation Just before starting the anesthetic in these cases it is advisable to empty the patient's stomach thoroughly by means of the stomach tube for in case this is not done as soon as he is completely under the anesthetic and the sphincters relax the patient is very apt to vomit a large amount of fluid and aspirate

this with the result that he drowns in his own vomitus To further guard against this I am taking the additional precaution to slightly elevate the foot of the table This will also facilitate the operation You will note the median scar through which the tubes were ligated two years ago and also these two scars on the right side from the old operations for the removal of the tumor This bulging on the right side is due to the distention of the gut protruding through the incisional hernia

Operation —We might open the abdomen through the incisional hernia so that we could repair the hernia after dealing with the ileus but with a patient suffering from ileus even of short duration it would be poor judgment to subject the patient to the additional time on the operating table that this would necessitate and so we shall not attempt to do anything with the hernia today Irrespective of the ileus one would not attempt a radical cure of a hernia while a patient has a chronic cough unless there were some special indication Furthermore it is impossible to know beforehand just where the obstruction is located and for this reason it is best to make a median incision As I am quite sure that the site of the obstruction is in the lower abdomen I am making my incision from just below the umbilicus downward toward the symphysis Through this incision an obstruction in any part of the abdomen can be thoroughly dealt with and this is a good incision in all cases where the site of the obstruction is in doubt It is essential to have ample exposure so that the operative work can be done quickly and the abdomen can be explored thoroughly

Now that I have cut through the skin and subcutaneous fat only the linea alba and peritoneum remain to be divided We are in the peritoneal cavity These red distended loops of bowel that present themselves in the wound are greatly distended loops of small bowel Although they have the caliber of large intestine one can tell that they are small intestine from the fact that they have no tinea show no haustræ and possess no appendices epiploicæ The very bright red color of these distended loops shows that due to the interference with the circulation and the prolonged stasis of the fecal stream they are greatly inflamed i e

a moderate peritonitis is already present. There is no free fluid in the peritoneal cavity however You see these distended coils show no peristalsis In other words an adynamic or paralytic ileus has taken place due to the prolonged duration of the obstruction This of course must be located below this portion of the bowel for as you know the portion of the bowel below the site of obstruction becomes collapsed whereas the portion of the bowel just above the obstruction becomes more and more distended. At first the musculature makes abnormally forcible efforts to overcome the obstruction Later however due to overactivity the muscle becomes paretic and finally paralytic, and the distention then increases

As we know that the obstruction must be lower down and is not in the large intestine I shall at once try to locate the ileocecal valve and beginning at this point shall follow the ileum upward until I come to the point of obstruction In cases where the site of obstruction has not been determined one should work systematically One of the best methods of procedure is to locate the cecum and determine whether or not this is distended In case the cecum is distended it is evident that the obstruction must be somewhere lower in the large intestine If however the cecum is not distended the obstruction must be somewhere higher and must, therefore be in the small intestine Beginning at the ileocecal valve one proceeds to follow up the collapsed small intestine until the point of obstruction is met with Above this point the bowel will be distended It is often imprudent however to follow this procedure for on opening the abdomen the distended loops so frequently present themselves and if one should attempt to palpate the cecum there might be danger of rupturing these greatly distended loops In such a case one attempts to find a collapsed loop of bowel and to trace its mesentery back to its origin from the spine in order thus to determine which is the right side or upper surface of the mesentery and which is the left or lower surface Having determined this if one proceeds to follow the loop to the left and upward he will come upon the site of obstruction which must be proximal to the collapsed portion of the bowel In this case I do not readily

find any collapsed loop, and so shall follow the distended loop downward and to the right I shall replace these distended loops of small bowel as I proceed in my search, for one should not eviscerate a patient I am now almost down to the cecum Low down in the right iliac fossa I am quite sure I feel a band that seems to be the cause of the obstruction I shall try to show it

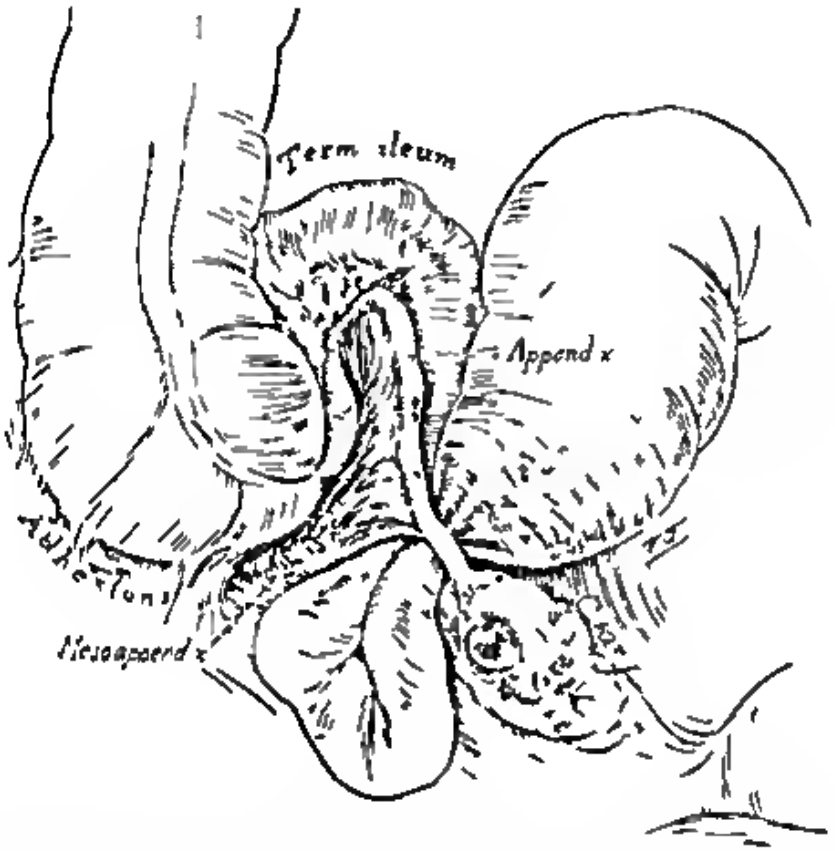


Fig 44—Drawing of the manner in which the appendix adherent by its tip to the cystic right ovary, acted as the strangulating band constricting the loop of ileum which has slipped behind it As can be seen the obstruction was caused by the loop being held against the posterior parietal peritoneum by the free portion of the appendix in front, the free margin of the meso appendix above and the cystic right ovary below

to you Yes, I am sure *I have found the cause of the trouble* Now you can see it You see *it is the appendix the tip of which is adherent to the right ovary* (Fig 44) The bowel above this area of constriction is distended, while you see that the portion below the area of constriction is collapsed It is now clear why I could not find any collapsed loop earlier You see that the obstruction is a very short distance from the ileocecal valve,

Fig. 4.—Photograph of appendix (natural size). Note the strong broad adhesions that bound the tip of the appendix to the area A. The tip of the appendix can be plainly made out B. Area can also the distal point of insertion of the meso-appendix (C. The portion of meso-appendix cut away is seen at the center of the appendix. The site where the appendix was clamped is also plainly to be seen (D.

that only a single loop of gut has been constricted the point of obstruction being about 15 inches from the ileocecal valve

The ovary is greatly enlarged and is cystic You see how thoroughly this loop is constricted, being held against the posterior parietal peritoneum by the appendix in front, the free margin of the meso appendix above, and the diseased ovary below As we have now already examined the entire small intestine, and as our fluoroscopic examination showed no obstruction in the large intestine, we are sure there is no second point of obstruction and can dismiss this possibility One must never fail to remember that there may be more than one point of obstruction I am now clamping and dividing the meso appendix, beginning near the tip, just as one does in any ordinary appendectomy Now that I have partially divided the meso-appendix I can slip my index finger under the appendix, between it and the constricted portion of the gut Now the gas in the distended portion passes downward into the collapsed portion and fills this out There is no peristalsis, however The fact that there is no peristalsis is of bad prognostic import, for even though the original cause of the ileus will be overcome as soon as the appendix is removed the patient may still die from ileus—*i e*, paralytic ileus The distended portion of the intestine contains practically nothing but gas This is explained by the fact that the patient had so thoroughly purged herself just before the onset of the ileus No operation for ileus is properly completed if the patient leaves the table with the abdomen greatly distended Now that the strangulation has been relieved, by gentle pressure I am forcing a considerable amount of this gas downward It is a question whether I should allow this air to escape by making a small incision in the distended gut or by inserting a needle This should always be done in case there is much fluid and gas in the distended portion of the bowel It seems hardly necessary however in this case

I am now completing the division of the meso appendix This is an unusually long appendix measuring somewhat over 5 inches You see the appendix extends almost vertically upward from the ovary, to which the tip is still adherent passes over the constricted loop of gut continues vertically upward for some distance, finally to arch laterally toward the medial surface of the cecum, which it then follows downward in a

vertical direction to its usual site of origin Now it is free except at its origin from the cecum and at its tip where it is still adherent to the ovary I am now separating it from the ovary It is now free from the ovary, and it only remains to remove it in the usual manner—*i e* to complete the appendectomy I introduce a purse-string of black waxed silk into the wall of the cecum about the base of the appendix, now apply two Kocher artery forceps near the base remove the proximal clamp, and ligate the base with a fine black waxed silk ligature in the groove crushed by the proximal clamp just removed. Now with the scalpel I amputate the appendix between the ligature and the distal clamp We now treat the stump with phenol followed by alcohol, invaginate the stump and bury it by tying the purse string There are a few old adhesions between the terminal ileum and the parietal peritoneum. These I doubly ligate and divide The cecum is still firmly bound to the parietal peritoneum by old adhesions but I shall not disturb these (Fig 44) It would be easy to remove the diseased right ovary but the patient s grave condition does not warrant even this short additional delay and trauma If the patient recovers I shall repair the ventral hernia at some future time after her cough has been controlled and through this incision I shall remove this right ovary As there is no free fluid in the peritoneal cavity I shall not drain. A drainage-tube would have nothing to drain away and might lead infection into the peritoneal cavity from without Drainage is not usually necessary in these cases. I am therefore closing the abdomen completely using a running plain catgut stitch for the peritoneum which I am closing separately I am now closing the fascia with a continuous locked No 2 chromic catgut suture I close the skin with a running black waxed silk suture No 3 The patient is in fairly good condition She will now be returned to bed and we shall have the head of the bed raised As soon as she comes out from the anesthetic she will be given a shock enema This consists of 8 ounces of black coffee with ½ ounce of brandy This will be repeated every four hours till three have been given. We shall then give her proctoclysis allowing the solution to flow for

two hours, then interrupting the flow for two hours, and then re-establishing the flow for a second period and continuing in this manner as long as may be desirable As a solution I like 4 per cent glucose in tap water This not only supplies nourishment, but is also an easily absorbable carbohydrate which I believe is of value in combating the acidosis which is very apt to develop in a patient with ileus This proctoclysis will be continued until the patient can take fluid by mouth without vomiting She will be given a 1 1-1 enema (1 ounce of Epsom salts, 1 ounce of glycerin, and 1 ounce of water) every morning for three or four days after which time she will be given a laxative by mouth if any is needed

The after treatment of this case will be of particular interest and importance because of the adynamic ileus that developed as a result of the long duration of the mechanical ileus For the same reason the prognosis is unusually bad

Postoperative Course and Treatment (May 17, 1917) — When the patient was returned to bed her pulse was 136 and respirations 28 The pulse was of fairly good quality The postoperative treatment mentioned above was carried out on the first day She only vomited once that day after the operation Water was given in 1-dram doses, beginning five hours after the operation, and she had taken 8 ounces by midnight and did not vomit after this had been begun The pulse varied from 120 to 140 during the day At 4 P M rectal temperature was 103 6° F and remained at this height until midnight The temperature having risen to this height so soon after the operation could not have been due to infection from the operation but was probably due to an aggravation of her pulmonary trouble

By midnight she had urinated twice passing 9 ounces in all At midnight, the patient having been quite restless for several hours the intern ordered morphin sulphate (¼ gr hypodermically) This was repeated again at 4 A M If an anodyne is required in these cases I usually prefer heroin (gr ¼)

May 18, 1917 At 8 A M her temperature was 104 6° F and pulse 132 At this time she received her first 1 1 1 enema This was expelled, with a small amount of yellow fluid, but no

real bowel movement and no flatus was expelled When I saw her at 9 A M her abdomen was considerably distended but there was no rigidity or particular tenderness. This I believed was entirely due to the paralytic ileus still continuing I therefore ordered physostigmin (gr $\frac{1}{60}$ hypodermically) and in addition strychnin (gr $\frac{1}{30}$ hypodermically) one hour after each dose of physostigmin. I also ordered a rectal tube passed as indicated and hot turpentine stupes applied to the abdomen.

I considered using pituitrin being familiar with the numerous recent publications on its value in paralytic ileus especially postoperative ileus Among these C L Gibson's[1] enthusiastic clinical report advocating the use of pituitrin is of particular interest, as he is a careful observer and his judgment deserves the greatest consideration On the other hand the experimental evidence on the action of the various pituitary extracts upon the intestinal contractions and tonus is very conflicting and the recent experimental investigations must receive due consideration

Shamoff[2] found that posterior lobe extracts—various commercial as well as freshly prepared and old laboratory preparations alike—instead of uniformly stimulating the unstriped muscle of the intestine to contract as has been commonly believed is the case showed great variability in their actions and often produced definite and well marked inhibition of the movements and tonus He believes that there unquestionably exists in the posterior lobe some substance which is capable of causing relaxation of the isolated intestinal loop and inhibiting its rhythmic contractions and that its presence or absence in the extracts may depend on their method of preparation He concludes that more accurate studies can only be made when this is perfected or when the active principle or principles of the gland become known

Hoskins[3] investigated the effect of intravenous injections of extracts of pituitary gland on the intact small intestine of dogs. In 5 cases out of 6 a clean-cut depression of tonus and peristalsis occurred

Similar observations have been reported by Pancoast and Hopkins[4] in a clinical study on the effects of pituitrin in 11 patients The action was studied by means of fluoroscopic

examination after administering a contrast meal They report that roentgen examination is an accurate means of studying certain phases of drug action upon the gastro intestinal tract of man While they found the effects of pituitrin were very variable there was sufficient uniformity in their observations to draw definite conclusions They found that in the small intestine motility was as a rule either not affected or slightly delayed In the large bowel the drug produced little or no appreciable effect on motility

As I had not had any previous experience with pituitrin in cases of paralytic ileus I decided not to employ it in this particular case and therefore decided to try physostigmin although I have not much faith in it and do not ever remember having seen any results that I felt could be attributed directly to it

At noon her temperature was 101 4° F and her pulse 104 As she vomited some greenish fluid at this time which was the first time she vomited since immediately after the operation, I ordered her stomach to be washed out

When I saw her in the evening her general condition seemed fairly good though her abdomen was still distended as in the morning in spite of the two doses of physostigmin repeated use of the rectal tube the continuous application of hot turpentine stupes and a second 1 1 1 enema given at 5 P M She had had a poor day and had vomited twice during the afternoon and had not been able to retain the little fluid by mouth During the day the glucose solution was continued per rectum Because of her toxic condition and the weakness of the pulse I deemed it essential for her to receive more fluid and so had her given a hypodermoclysis of 1000 c c of Ringer s solution at 6 o clock and had this repeated at 10 P M Hypodermoclysis has been found of value in cases of adynamic ileus The explanation given is that it increases the circulation and therefore aids in removing the toxins During the day her temperature had gradually dropped and at midnight it was 101 8° F rectally Her pulse had also gradually come down during the day to around 120

May 19 1917 When I saw the patient this morning the third day after operation her temperature was 100 8° F rectally

and pulse 120 She had vomited twice during the night. Her abdomen was still distended as it had been the day before. The use of the turpentine stupes rectal tube and stomach tube were continued as was also the glucose solution per rectum. The patient was given but very little water by mouth. A 1 1 1 enema given in the morning failed to cause the passage of a stool or flatus. Another one given in the afternoon resulted in the passage of some flatus but no bowel movement.

When I saw her in the evening her temperature had risen to 102 4° F and pulse was about the same as in the morning—120 As I was convinced that I had overcome the original cause of the ileus I decided to give the patient a cathartic that night. I therefore ordered calomel gr ½ given every half hour for five doses. She vomited a brown offensive fluid twice during the afternoon and evening

The morning specimen of urine showed a specific gravity of 1030 acid reaction a trace of albumin no sugar acetone or indican. The microscopic examination showed no casts and only an occasional white blood-cell. Her leukocyte count was 7000

May 20 1917 On the morning of the fourth day her temperature had come down to 100 4° F and pulse 112 She had vomited once during the night a coffee-colored fluid. As there was no result from the calomel by the time I saw the patient, I ordered milk of magnesia to be given in dram doses every three hours An enema given in the evening was expelled with considerable flatus but no stool The turpentine stupes and glucose solution were continued the entire day She spent a poor day and the distention had not decreased

The morning specimen of urine was entirely negative. A complete white blood count was made and showed 8200 leukocytes A differential count showed 79 polymorphonuclears 13 small lymphocytes 4 large lymphocytes and 2 transitionals

As I felt certain that I had completely overcome the obstruction I believed the continuation of the ileus was due to the fact that the original obstruction had been present for such a long time before operation that we were now confronted with a paralytic ileus However I considered the possibility of having pro-

duced a volvulus in returning the distended loops of bowel into the abdomen but as I had exercised great care in doing this I felt satisfied that such a complication had not occurred I had considered the wisdom of re-opening the abdomen on Saturday to exclude the possibility of a volvulus but decided I was probably confronted with a paralytic ileus only and as the pulse and temperature had come down gradually and the leukocyte count was only 7000 it was safe to wait to see the results of the cathartics given by mouth

By midnight she had received four doses of milk of magnesia During the night this was continued every three hours also

May 21 1917 The next day the same treatment was continued except that 20 per cent brandy was added to the glucose solution in order to increase the amount of stimulation and nourishment From 1 to 3 P M she received 28 ounces from 5 to 7 30 ounces from 9 to 11 and from 1 to 3 a total of 30 ounces and from 5 to 7 25 ounces This was a total of 113 ounces by proctoclysis—20 per cent of this being brandy she had received 22⅝ ounces of brandy

During the day her temperature varied from 100° to 101 4° F rectally Her pulse varied from 100 to 112 Her morning 1 1 1 enema was expelled with considerable flatus but no formed stool An enema given late in the afternoon was expelled with considerable flatus and a few feces She spent a fairly good day and only vomited once some greenish fluid no longer any brownish foul material At 9 P M she spontaneously passed a large liquid stool with small particles of feces She spent a fair night.

May 22 1917 On the morning of the sixth day following her 1 1 1 enema she passed a large formed stool Following this the distention completely disappeared She was now given a light soft diet

From this time on she made an uneventful recovery as far as her ileus was concerned Her lung condition however continued to annoy her and she has run more or less temperature ever since and the condition has not improved now in months Indeed it seems to have progressed somewhat

Unfortunately, due to her constant uncontrollable coughing a hernia has developed in the recent operative scar but this is only what was anticipated as unavoidable in such a case

Meissner[5] in a recent article reports a case of strangulation ileus caused by the appendix acting as a constricting band. The patient gave a typical history of appendicitis and at operation the tip of the appendix was found adherent to the anterior abdominal wall three fingerbreadths below the umbilicus and about three fingerbreadths to the right of the median line The tip only was adherent and the body of the appendix acted as a constricting band strangulating a loop of small bowel which lay wedged in between the appendix and the anterior surface of the cecum

He ends his article with the statement that he is not familiar with a single similar case and therefore believes this interesting kind of strangulation ileus caused by the adherent vermiform appendix, ought to be reported It is surprising that a German surgeon should be so unfamiliar with the available German literature for perhaps the most comprehensive monograph on ileus is that of Wilms [6]

Wilms[7] quotes Hilgenreiner's statistics on the frequency of strangulation ileus due to bands omentum diverticula etc. *Hilgenreiner found that of 298 cases of strangulation ileus due to such causes the appendix acted as the constricting band in 34*

In addition Wilms gives a list of cases reported in the American English French, and German literature in which the appendix acted as the constricting band

In conclusion it may be of interest to know that Wilms[8] points out that *of all the organs the appendix is the one which on account of its adhesions gives rise to strangulation ileus most frequently* Similarly Sprengel [9] in his monograph on Appendicitis in connection with his chapter on intestinal obstruction in relation to appendicitis appends a list of cases in which the appendix itself acted as the constricting band The appendix may become adherent to the mesentery to the lower ileum to the cecum, in the right iliac fossa in the region of the rim of the pelvis, in the true pelvis to the rectum to the bladder to the right ovary (as in this case) or even to the descending colon.

Cases of strangulation caused by the right fallopian tube becoming adherent to the right iliac fossa are more rare

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CLINIC OF DR CARL BECK

North Chicago Hospital

CONSERVATIVE SURGERY IN CHILDREN

Summary Local resection and open treatment *versus* amputation in the management of injuries and infections of the extremities demonstration of a case of pyogenic infection of the ankle joint with necrosis of entire tarsus successfully treated without amputation

The case of this boy is illustrative of the necessity of conservative surgery in children Of course conservative surgery is not limited to children and should be practised on the adult as well This war is certainly teaching great lessons in this respect With the large losses of extremities and injuries to the body and large numbers of men incapacitated, the question of conservatism has entered very strongly into the consideration of operative procedure in cases of injuries But not alone injuries also other pathologic conditions require conservatism It is a fact that radicalism in surgery is compatible with conservatism notwithstanding that both represent two entirely opposite principles To strike just the happy medium is the most important factor and is determined by the surgical tact and experience of the operator When we had to deal for instance with a tuberculous process resulting in the destruction of all the small bones of the wrist, marked edema of the hand and with tubercular masses and granulations perhaps several fistulæ in the skin above the lesion we used to believe that we had an absolute indication for amputation above the seat of the tuberculosis This left of course a stump-arm It seemed pitiful to sacrifice the healthy fingers and thumb with their great possibilities of usefulness just because the intermediate portion between the healthy hand and the forearm above the diseased wrist was so far advanced in destruction and still no conservative measures seemed to be at all successful

Resections of the diseased tissues have been tried many times, but blood vessels and nerves had to be sacrificed to such an extent that either a limp hand, which could be made of no functional use, or necrosis of the entire hand, was the result, and consequently the procedure was thought of no avail. The same applied to disease of the hip or knee if the resection had to be made so extensive that blood vessels and nerves had to be sacrificed, it was thought that there remained nothing but amputation above the seat of the lesion

During the last few years we have learned, through the treatment with bismuth injections, through the treatment with x ray and blue light, to improve these conditions of tuberculosis to such an extent that we often transform diseased bones and soft tissues into cicatricial and still useful bridges between the healthy fingers and the healthy forearm The same principle applies to knee joint and ankle joint affections

The radical surgeon who amputates obtains a speedy recovery of the patient, of course, but with a badly mutilated arm or leg I have repeatedly seen examples of such radicalism, which seemed to me to represent much unnecessary sacrifice, and it has always been my endeavor to be as conservative as possible before giving up an arm or foot to amputation In children especially this principle should prevail since there is a most remarkable possibility of reconstruction by nature

As an example of conservative surgery in children I present to you this boy Master D S, aged ten was brought to me by his parents after he had been under treatment by one of our good local surgeons for several weeks As this surgeon told me the boy came to him with a septic infection localizing itself in joints of the elbows and one foot The elbow infection was not of such a stormy character as that of the foot, where suppuration took place within the small bones destroying portions of them, invading the tendon sheath, and causing local destruction Fistulæ necessitated incisions in different directions, the introduction of tubes for drainage, etc Nevertheless the fever kept up until the day he came to me, after consulting several surgeons who had advised amputation of the foot The father was very reluctant

to sacrifice the foot of this boy and decided to change surgeons I mention this fact because it shows the necessity of the publication of articles to preach conservatism, since in this case the decision of very good men who were called in consultation was that the case was beyond recovery (Fig 46)

It occurred to me after examination with the *x* ray that the infection which still caused considerable fever could be exterminated by making extensive resection of the bones forming the

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extensive Nothing was left of the astragalus of the calcaneus of the cuneiform bones, and even the adjoining parts of the meta tarsal bones were removed (Fig 48) The greater portion of the metatarsal bones and phalanges were left, however, since they did not seem to be involved The tendons, as far as they had not been destroyed, the blood vessels the dorsal artery, and the external and internal malleolar arteries were left so that there

Fig 47 —Our operation opening the foot by joining the two medial incisions Note the extent of the cavity In a basin near by are the bones which have just been removed

was good circulation The whole cavity was packed tightly with gauze and left for granulation (Fig 49) A few days later the foot was put into a permanent bath and the liquid changed very often Rapid granulation followed filling out the cavity and inside of a few weeks it seemed as if that whole cavity which had been the size of a small fist was filled out completely with a granuloma (Fig 50) The skin wound closed and the foot,

somewhat edematous but otherwise in the same shape as before was retained

The boy began to hobble around on crutches Fever disappeared and he gained in weight and spirits Function of the foot was at this time not present inasmuch as it was very heavy and still considerably painful, especially at night There was no dis

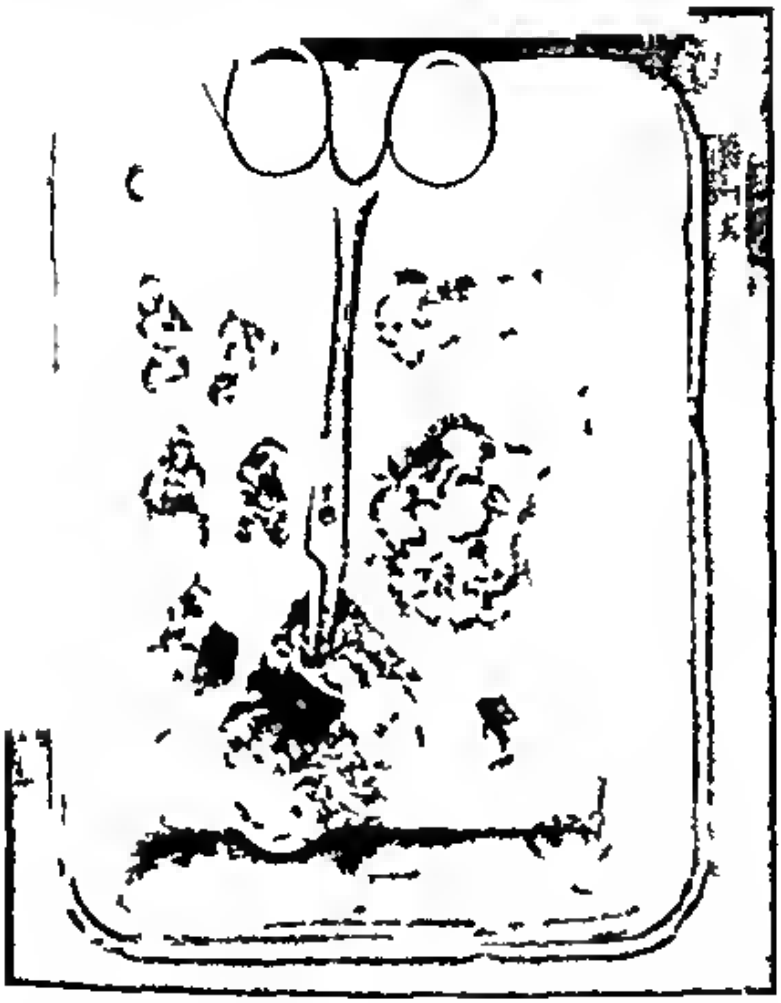

Fig 48—Showing the calcaneus astragalus cuneiform and the sequestra of other bones removed from the cavity

charge from anywhere and it seemed that as far as surgical results were concerned the foot although painful at night was closed An x ray picture taken a few weeks afterward showed there was some re formation of bones calcareous deposits being visible in places where there had been no bone before (Figs 51 and 52)

The pains continued however and several months afterward

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Fig 51.—Skiagraph of the foot before operation

Fig 52.—Six weeks after operation. The dark blotches represent remnant of bismuth paste. Note areas of calcification in region formerly occupied by tarsal bones

Fig. 49.—The cavity packed with three large strips of gauze

Fig. 50.—Two weeks later—the huge cavity has been almost obliterated by granulation

bandage was placed on the foot so as to prevent the foot-drop, which made it difficult for the boy to use the foot The boy is now beginning to walk without the aid of a crutch (Fig 53) His elbow, which had been discharging somewhat, eliminated a small sequestrum and then healed up with perfect restoration of the function

Here, then, is an example of the possibility of avoiding amputations Of course the pathologic condition in this case was not tuberculosis, and therefore, once the septic process was eliminated and the cause removed the process did not return but the same principle applies to tuberculosis if such a radical operation of the bones and structures is possible

While I said in the beginning that conservative surgery is indicated in all surgical procedures on the extremities particularly the hands, it is more so in children, since in children even small patches of periosteum help to re form bone so that a good deal of lost substance can be replaced The *x* ray pictures in this case in particular show that in a very short time calcareous deposits formed from small bridges of periosteum, imitating more or less the skeleton which had been removed

it was suggested that the continuous pain might be due to some inflammatory condition, although not to suppurative changes of some of the cartilages of the joint and of the metatarsal bone particularly that of the large toe It was decided, therefore to

Fig 33 —Patient perfectly cured standing on his foot showing the absolutely good position

eradicate the diseased portions of these bones and also the newly formed bone so as to give the foot another chance to form better and less inflamed bone This time the operation was performed by Dr Emil Beck in my absence was very successful and the foot now is healed absolutely without pain A plaster-of Paris

EXTENSIVE LACERATION OF THE FOREARM AND HAND WITH DECOLLATION OF THE INTEGUMENT, LACERATION OF MUSCLES, AND FRACTURE OF BONES, OPEN WOUND TREATMENT; RECOVERY WITH PERFECT FUNCTION.

On April 23 1917 Mr John L was brought to the hospital with a severe injury of his left forearm and hand He is a mechanical engineer in a paper manufacturing concern and was just giving orders to a man to stop the engine when the man accelerated it instead by working the wrong lever and in doing so he pulled the engineer's hand between two rollers With a jerky movement the injured man pulled back his fingers before the rollers which were connected with a strong spring had a chance to get a firm hold on the larger portion of his hand otherwise it would have been crushed to a pulp This jerky movement together with the suction of the rollers tore the skin from the forearm and pulled it with some of the underlying structures over the hand up to the fingers like a glove is pulled off of a hand tearing with it a number of the muscles some tendons nerves blood vessels, and breaking the metacarpal bones just below the heads of each metacarpas except the thumb The patient was considerably shocked when he came The skin which had been rolled up on the hand toward the fingers was covered with a piece of cheese cloth and there was a tourniquet made of a towel around his forearm nevertheless there had been some bleeding from the hand The integument was considerably soiled by oily material such as an engineer would have on his hands while working There were some particles of dirt on the surface of the lacerated hand Only 1 inch of a bridge of intact skin corresponding to the external portion of the forearm was left the balance was severed as by a sharp instrument The picture shows the condition looking at it from the radial side of the hand (Fig 54)

The question arose as to the treatment There was a great deal of temptation to sew up the wound with some tube drainage after possibly having reunited those structures which had been severed like muscles and tendons

The first step was the ligation of some of the vessels and then I decided to treat it according to the principle of the open wound treatment—*i e* to pack the large cavity underneath the skin

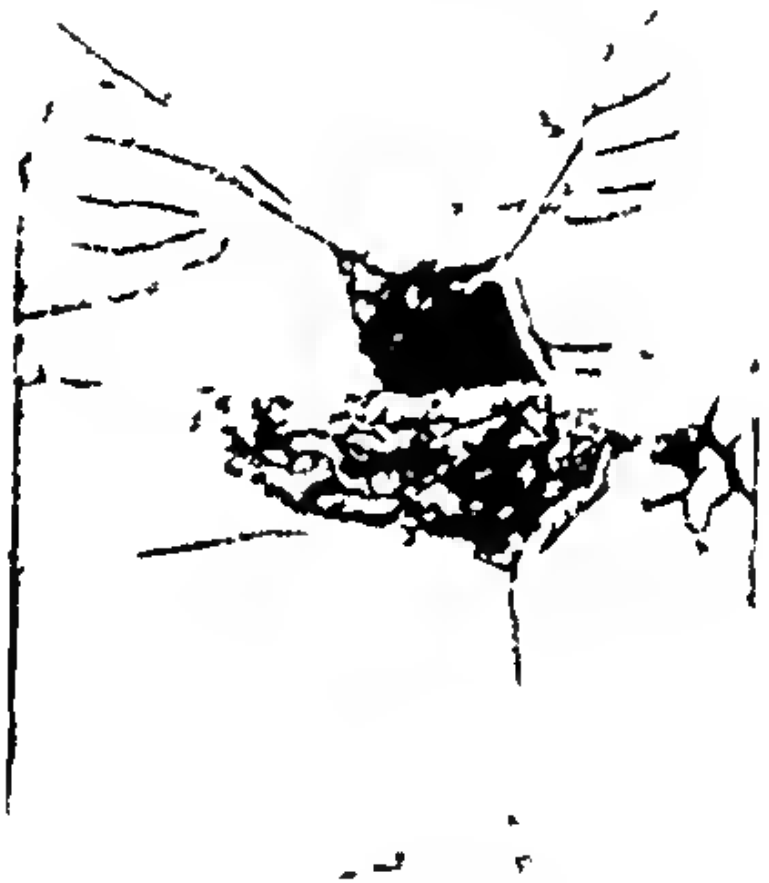

Fig 54—Aspect of the wound immediately after the injury Viewed from the radial side

loosely with gauze allowing every bit of secretion to discharge through the wide open breach in the skin We gave the patient him to bed immersing lysol which was con continuous bath was changed to an ordinary moist dressing after he had remained free from fever for forty-eight hours

Fig 55 — Appearance of the hand after removal of the pack Part of the tissue of the thumb sloughed off

Fig 56 — Appearance of the hand after secondary suture has been made showing the union without reaction except in the region of the thumb Here the skin appears black but is still continuous with the healthy skin

Our greatest concern was to prevent infection of the sheaths of the remnants of the tendons Inasmuch as some of those

The question arose as to the treatment. There was a great deal of temptation to sew up the wound with some tube drainage after possibly having reunited those structures which had been severed, like *muscles and tendons*

The first step was the ligation of some of the vessels and then I decided to treat it according to the principle of the open wound treatment—*i. e.* to pack the large cavity underneath the skin

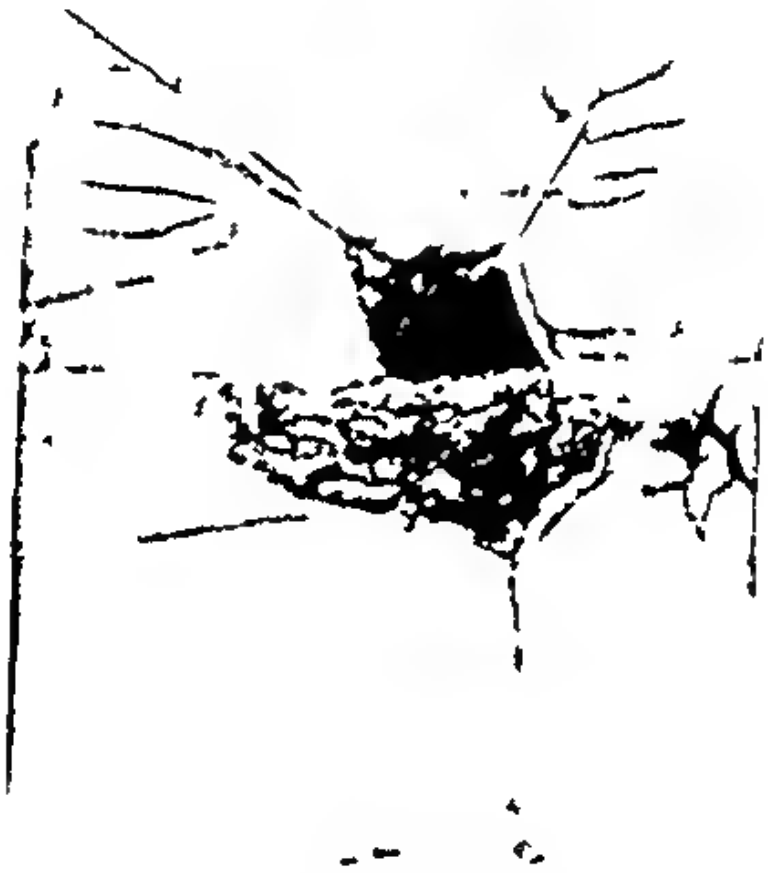

Fig. 4.—Aspect of the wound immediately after the injury. Viewed from the radial side.

loosely with gauze allowing every bit of secretion to discharge through the wide open breach in the skin. We gave the patient an injection of antitetanic serum and put him to bed immersing his hand in a light antiseptic solution of lysol which was continually heated by an electric lamp. This continuous bath was changed to an ordinary moist dressing after he had remained free from fever for forty-eight hours.

tendon sheaths had been torn open and were in open contact with the air a retention of secretion would certainly have caused abscesses and the leakage of infectious material into the hand and forearm As it was there was not the slightest reaction beyond the tear in the forearm After one week the inner surface

Fig. 57.—Shows the hand at present time held up in extension. The elliptic piece of skin over the thumb is the skin-graft which has been transplanted from the arm. The scar over the radial part of the wrist is still somewhat hard, but is getting better continuously.

was bright red on some places beginning to granulate on others still throwing off some of the superficial necrotic tissue but luxuriantly red It was then deemed opportune to sew up the wound and under general anesthesia the wound was sutured as far as possible along the lines of the old tear Figs. 55 and 56) Only in the region of the thumb a portion of the skin loughed

off, leaving exposed the muscles of the thenar eminence whic h had become considerably swollen and were very bulky A fe v skin grafts were placed over this granulating area two of which healed very nicely, the third one, however became ne rot For a long time there was considerable discharge from the tend n sheath of serous material The hand looked very clumsy a id ti f but gradually even those few places which did not receive th skin graft became covered with scar, and the clu ns h l

Fig 58—Sho ng the fingers in extreme flexion as far as t n l bl

which seemed almost motionless and stiff is now movable in every direction (Figs 57 and 58) All the function and sensi bility is restored and the edema to the greatest extent gone There is only one hard scar corresponding to the short flexor of the thumb which prevents the patient from total abduction of his thumb This hardened callous scar will require resection Strange as it may seem everyone of the scars are somewhat ke loi l a condition which as my assistant observed seems to pre

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off leaving exposed the muscles of the thenar eminence which had become considerably swollen and were very bulky A few skin grafts were placed over this granulating area two of which healed very nicely, the third one, however became necrotic For a long time there was considerable discharge from the tendon sheath of serous material The hand looked very clumsy and stiff but gradually even those few places which did not receive the skin graft became covered with scar, and the clumsy hand

Fig 58—Showing the fingers in extreme flexion as far as it is now possible

which seemed almost motionless and stiff is now movable in every direction (Figs 57 and 58) All the function and sensibility is restored and the edema to the greatest extent gone There is only one hard scar corresponding to the short flexor of the thumb which prevents the patient from total abduction of his thumb This hardened callous scar will require resection Strange as it may seem everyone of the scars are somewhat keloid a condition which as my assistant observed seems to pre

vail lately in a large number of wounds. The cause is not clear to me, but I see keloid much more often than formerly. The accompanying pictures show the extent of the injury.

Just at this time in view of the war situation it seems a good idea to dwell on such subjects as the treatment of large lacerated wounds with resultant perfect functional result, and that is the reason I have been describing this condition to you a little more in detail than might otherwise be desirable.

CLINIC OF DR FREDERICK G DYAS

Cook County Hospital

CLINICAL TALK ON LOCAL ANESTHESIA IN MAJOR SURGERY

Summary Greatly extended use of local anesthesia in the last ten years discovery of cocain and the invention of the hypodermic syringe and novocain contra ind cations for local anesthesia combined nerve blocking and infiltration the method of choice local anesthesia and the rel ef of chronic pain

It is a significant fact that in the statistics compiled from three large German hospitals in the last ten years the number of major operations performed under local anesthesia increased from 1 to 52 per cent This statement, quoted from Braun, must interest the entire surgical profession Furthermore, it is the experience of every operator that the morbidity and mortality from general anesthetics is still too great Almost every day in a large operative service the surgeon must postpone operations because of the danger of a general anesthetic

Local anesthesia of course has long antedated general anes thesia, having been practised by the ancients in the form of nerve compression, localized ischemia the application of cold, and in the instances of open areas the application of soothing herbs Mention of the use of Indian hemp mandragora and poppy are found in some of the earliest medical writings These local measures were frequently combined with the use of sedative drugs, such as opium and its derivatives and to a much greater extent alcohol, in the form of rum and whisky It remained, however, for the introduction of the hypodermic method and the administration of the concentrated form of drugs to renew the interest in local anesthesia

There is some dispute as to whom the credit belongs for the introduction of this method In this country Wood in 1850,

was given credit for the discovery of this method However Allen in his splendid treatise on local anesthesia confers the credit for the discovery of the hypodermic syringe upon F Rynd of Edinburgh in 1845 At first the hypodermic syringe was used for the injection of solutions of the derivatives of opium into and about nerve trunks and later such substitutes as chloroform and ether were used for local anesthetics These drugs however were found to be unsatisfactory and it remained for Schleich to popularize the hypodermic method of anesthesia by the use of cocain Cocain deserves an equal place in the history of local anesthetics with the introduction of the bypodermic syringe Cocain had been known for many years to the natives of certain tropical and semitropical countries in Central and South America. Its influence however as known to these semicivilized people at an early date differed considerably from the physiologic action of the drug as it is employed today The chewing of the cocoa leaves gave to the individual great powers of physical endurance and indifference to pain and fatigue The leaves were therefore chewed by those in pain and by those undergoing severe physical tests When the leaves were exported it was found by those who used them for similar purposes that like results were not obtained This was probably attributable to the changes instant to drying and transportation (Allen) Koller in 1884 published a work on the local effects of a 2 per cent solution of cocain in opbthalmic surgery The use of this agent was then taken up largely by ophthalmologists and laryngologists and since that date has been employed largely It however has not been altogether satisfactory because certain individuals showed an idiosyncrasy for the drug and in other cases fatalities resulted As a result its use for a long time was confined to the so-called surface anesthesias by which is meaot the application of the drug by rubbing or dropping upon the mucous or abraided skin surface

The use of cold as a local anesthetic has been employed generally in the form of rapidly evaporating agents of which ethyl chlorid is the best known and most used As a local anesthetic however this agent does not meet every requirement and

has the disadvantages of sometimes producing necrosis of the tissue

The electric current has been used in connection with drugs but has not been generally satisfactory It remained for the introduction of novocain to give to local anesthesia the impulse which has popularized it within the last few years The fact that novocain may be used in sufficiently large quantities for the production of an adequate local anesthesia for the performance of most major surgical operations has conferred a great blessing upon humanity While novocain cannot be classed as absolutely non toxic, it may be used in sufficient dosage to procure practical freedom from pain without hazard to the patient The operator must ever bear in mind that the rapidity of absorption of any toxic agent is proportionate to the amount of risk incurred Therefore, one may use a large amount of novocain in those situations where absorption is slow and where the amount used is spread over a considerable period of time without danger to the patient The use of this agent is finding an ever increasing field of usefulness As contraindications to its use may be mentioned (1) acutely inflamed areas such for instance as in acutely inflamed appendix, (2) in very young children and (3) in individuals who are hysteric In intra abdominal operations where considerable handling of the bowel is necessary and great relaxation of the abdominal muscles is desired it is a good plan to supplement the local anesthetic with a short gas or gas ether narcosis

During this year I have increased the scope of the work done with novocain to include surgery of the bones and have been surprised at the facility with which it is possible to do this work under a local anesthetic (Figs 59 60) The method of choice in the production of local analgesia is the combined infiltration and nerve block as advocated by Heinrich Braun In a short analysis of the subject such as this it is impossible to give all the various methods for the different types of operative procedure but this general principle will hold good for all cases e g the infiltration of the skin along the line of incision and the blocking of the nerves supplying that area By this method it is quite possible to do painless amputations and all types of major sur

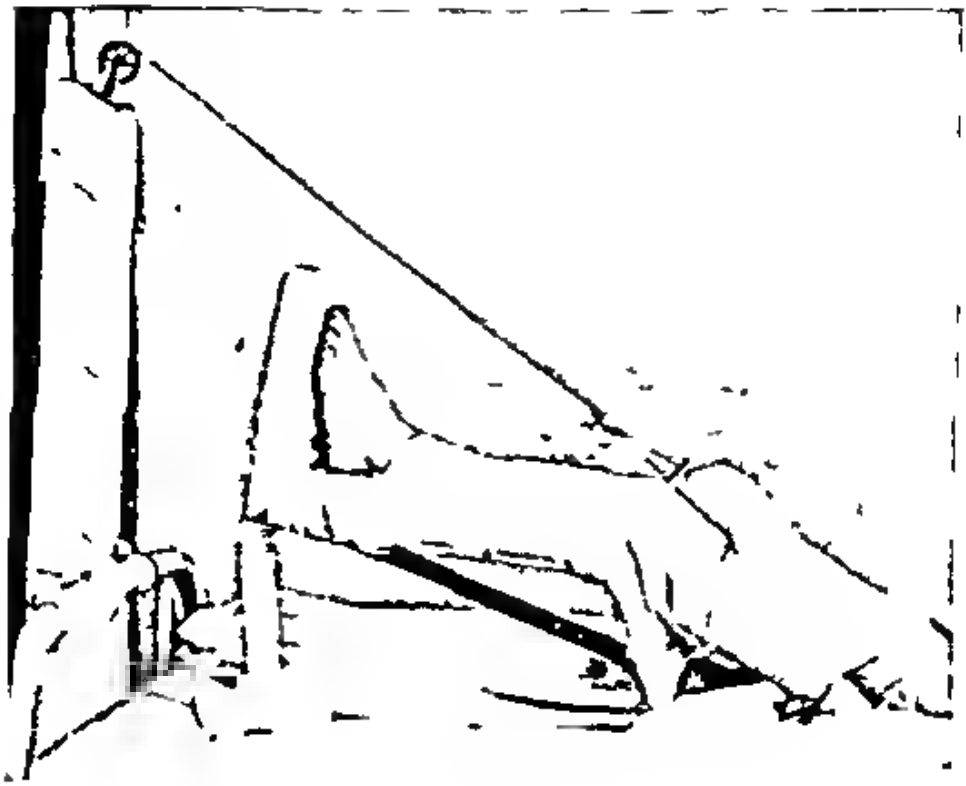

Fig 59

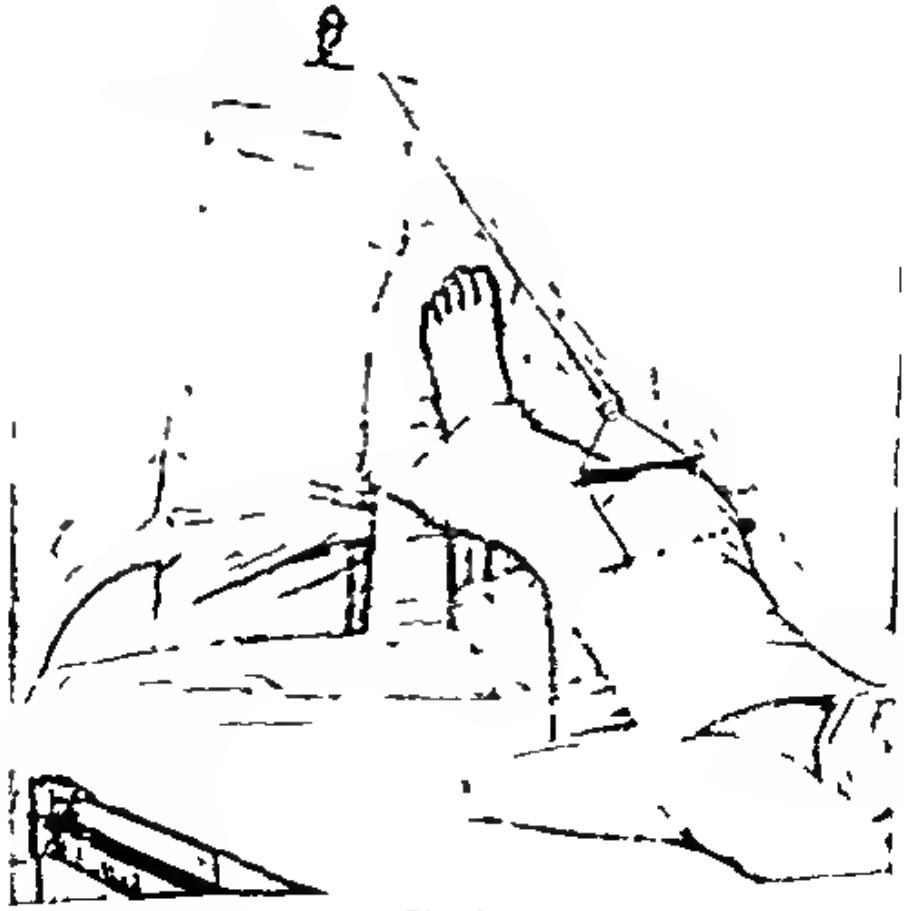

Fig 60

gery The method of Kühlenkampf for the blocking of the brachial plexus at a point just behind the middle of the clavicle and extending downward until the needle touches the first rib as it passes beneath the clavicle and then withdrawing the syringe slightly meanwhile asking the patient to exclaim when he feels the sensation reaching down his arm and then injecting from 5 to 10 minims of ½ per cent novocain and adrenalin solution will produce a complete anesthesia of the upper extremity By this method I have been able to reduce old Colles fractures with entire absence of pain to the patient A slight motor paralysis may follow the use of Kuhlenkampf s method but it is only temporary and is a negligible consideration in the procedure This method also affords relief in malignant growths about the shoulder In one case of sarcoma of the humerus with intense pain the brachial plexus was injected after the manner of Kuhlenkampf and the patient immediately declared that he was free from pain It may also be used for the relief of pain in chronic conditions such as carcinoma of the uterus by the blocking of the sacral plexus through the sacral foramina

I believe that the field of local anesthesia in the future will not at all be limited to surgical anesthesia but will include within its scope the relief of chronic pain as is already being done by the neurologists in the injections of the trigeminus for tic douloureux The security with which many operations may be done with local anesthesia makes it incumbent upon the surgeon to present its advantages to the patient before operation in order that the patient may choose for himself whether he will accept the hazard of a general anesthetic or undergo the operation with entire freedom from pain by the local route The success which attends the use of local anesthesia increases in exact proportion to its use The more one uses it the more proficient one becomes and the less pain is suffered by the patient In a series of 85 inguinal herniotomies done under local anesthesia no infection resulted which could be traced to the anesthesia and in no instance was

Figs. 59 60.—Application of Steinmann nail extension to fractures under local anesthesia In this case the nails shown in place were driven through the condyles of the femur using ½ of 1 per cent novocain solution for analgesia

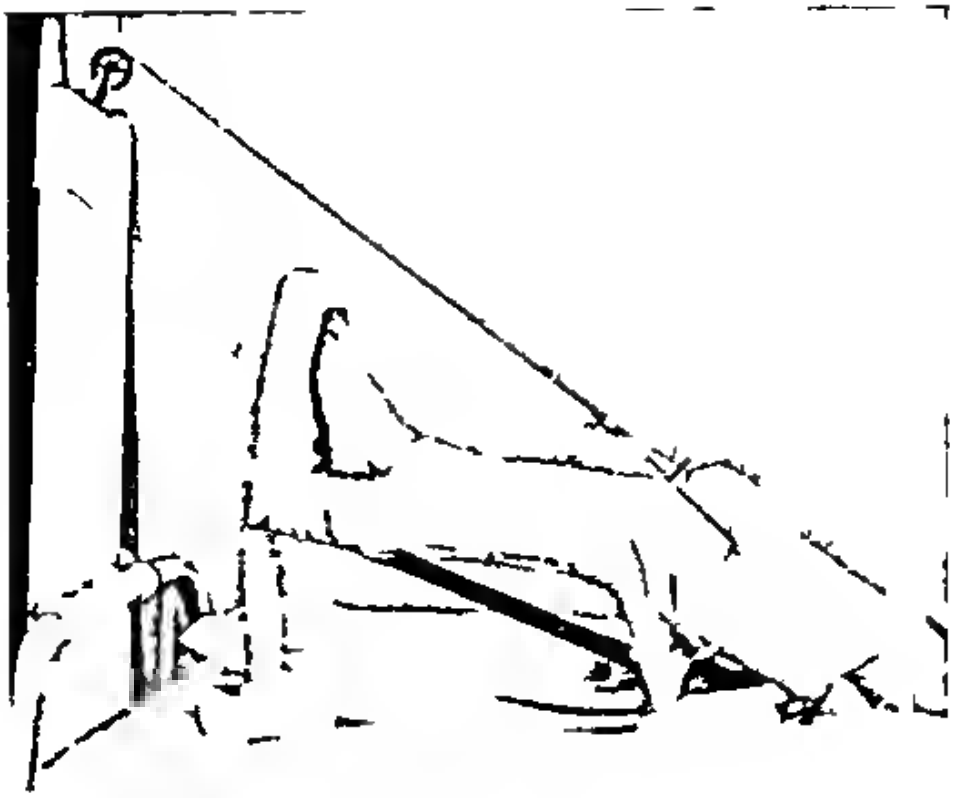

Fig 59

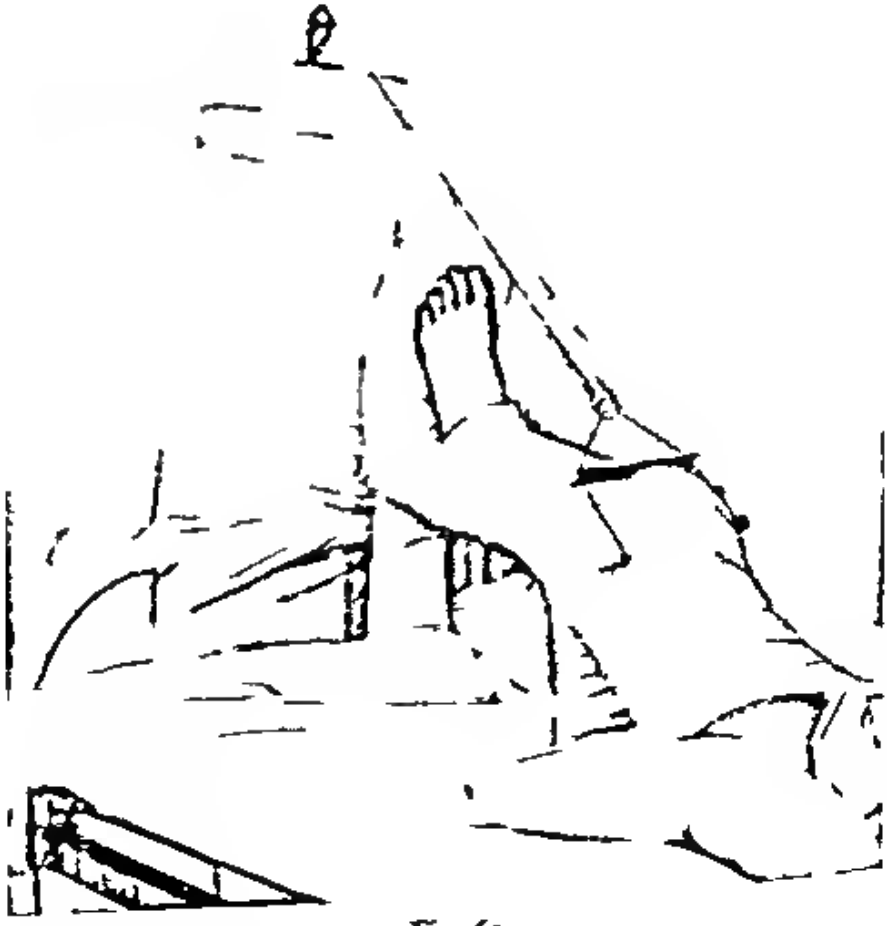

Fig 60

DIVERTICULUM OF URINARY BLADDER

Summary Diagnosis simplified by use of cystoscope and x ray pathology disclosed at operation methods of treatment suprapubic drainage adopted in present case prognosis

THIS patient a laborer aged fifty two years presented himself because of difficulty and pain upon urination Five years ago he began to have difficulty in passing urine There was no pain associated with it at that time but when he attempted to urinate a small stream would come and then stop and then another stream after straining He states that up until five years ago he never had any trouble during urination

Previous History —It is of importance to record that twelve years ago the patient had a Neisserian infection However no stricture resulted from this infection He states that he was treated by means of an electric light passed into the bladder and that he has had no return of the trouble He denies syphilis His history otherwise is unimportant

On examination the only finding of interest is the presence of a large oval swelling just above the symphysis pubis corresponding to the region of the urinary bladder It is dull and painful to percussion and not freely movable There is marked rigidity over the mass Examination of the prostate per rectum shows no enlargement of any of the lobes no irregularities and no hard areas It is of normal consistency and not tender

A clinical diagnosis of acute urinary retention possibly due to stricture was made A metal catheter was passed and 1 quart and 4 ounces of urine were removed He was referred to Dr Frank N Pfeifer for cystoscopic examination who reports the following

On May 16th the bougie introduced shows a distinct narrowing 16 cm from the meatus urinarius Size No 15 French was introduced and this was readily dilatable to a No 19 A gum bougie was introduced and 24 ounces of urine withdrawn This

it necessary to resort to general narcosis. The method has a further great advantage that the operator must be gentle in handling of the tissues, as a result of which operative trauma is minimized. The general comfort of the patient after the operation is much improved because of the lessened trauma in the operative field. Convalescence is not complicated by the anesthetic. Ambulatory patients may be immediately discharged after the operation. An anesthetist is not necessary, but a moral anesthetist is desirable The use of adrenalin renders the field less bloody, prolongs the anesthesia, delays absorption, and thereby lessens the toxicity The nerve-block as an anesthetic for chronic pain has as wide an application as its use for operative procedures.

ticulum but was a failure, as the diverticulum evidently contained considerable water, and the dilatation caused a failure to produce a shadow On examination by the *x* ray the position of the catheter was shown (Fig 61) The diverticulum is very large and the reason that the catheter did not coil was because it was not long enough

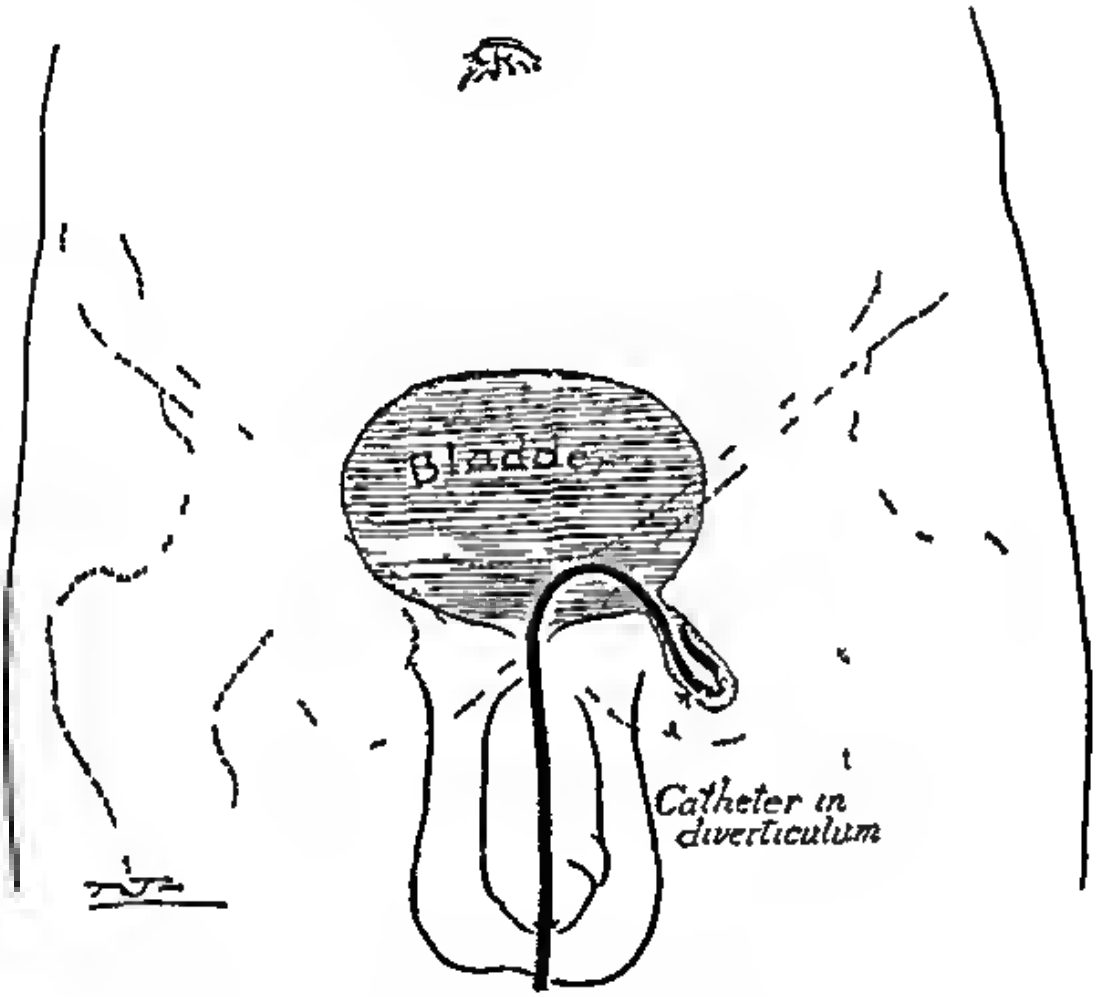

Fig 61—Diagram illustrating *x* ray findings with shadow catheter in diverticulum of the bladder

'There seems to be two distinct obstructive lesions in this case one at the vesical neck and the other at the apex of the prostate A suprapubic cystotomy is advised

Report of the *x* ray findings by Dr Blaine are as follows

The catheter passes to the right of the median line inward to a point opposite the sacrum It then crosses downward and to the left and to about the lateral wall of the pelvis Then it

was followed by the insertion of 1 dram of 1 per cent. silver nitrate solution."

Two days later a cystoscopic examination was made by Dr Pfeifer, with the following findings

"The urethra was found to be distinctly tortuous at 16 cm. from the meatus urinarius and was pushed over to the right. On digital examination there was felt a distinct infiltration at the apex of the prostate This possibly accounts for the findings in the urethra. I was able to introduce a No 18 French cystoscope. The bladder medium was hard to clear continually being fouled by pus. On the introduction of the lens system the cause of this was apparent, as there was a distinct opening in the bladder wall slightly to the left of the median line and posterior to the interureteric ridge The size of this opening was approximately $\frac{1}{2}$ inch, and from it there poured a continuous stream of pus which had its origin in a sac or pouch evidently a diverticulum of the bladder The bladder mucosa in general showed a distinct loss of lustre The mucous membrane was red thickened and swollen, and there was also a tendency to trabeculation, but in no other part was it possible to see a distinct diverticular opening The diverticulum is round No trabeculation was seen in the immediate and surrounding areas. The ureteral orifice was not visible. The trigone was swollen and elevated and the vesical neck was red the mucous membrane swollen and there was a distinctly elevated border This latter was due to the enlargement of the middle prostatic lobe The lateral lobes showed very little enlargement, particularly in the intravesicular protruberance. The posterior urethra was elongated especially that portion between the verumontanum and the vesical neck. The verumontanum was enlarged. The posterior urethra also was markedly dilated. The posterior sulcus and also the prostatic sulcus on each side of the verumontanum were entirely obliterated by these distentions. This is very unusual and was undoubtedly due to the condition of the apex of the prostate This condition is extra urethral and not in the lumen of the canal.

An x ray catheter was passed into the diverticulum and a skiagram made. Thorium nitrate was injected into the diver

(*d*) Peritoneal drainage of the bladder

(*e*) Forcible stretching of the orifice of the diverticulum

(*f*) Curetment of the mucous membrane of the diverticulum and suture of the latter without drainage

(*g*) Invagination of the diverticulum and the bladder, freshening of the margin of the orifice, and closure intraperitoneally

(*h*) Enlargement of the orifice of communication between the diverticulum and the bladder wall, or a new anastomosis

(*i*) Division of the walls of the bladder and diverticulum and suture of the cut walls

(*j*) Suprapubic drainage

The last mentioned was the method followed in our case Two drainage tubes were used, and one was sutured by catgut into the diverticulum and the other was secured by adhesive to the skin of the abdomen for bladder drainage The patient was immediately better after the drainage and within a week began to urinate by the natural route The drainage-tube into the diverticulum was freed at the end of ten days and no pus was found in the urine The drainage tube in the bladder still remains at the end of three weeks but will be removed, and the patient should have a clinical recovery

It was impossible in this case to invaginate the diverticulum, and it was thought that it might be dangerous with so large a diverticulum to obliterate the opening by curetment and suture The extensive operation by the sacral or peritoneal routes were thought to be too hazardous for the patient who was in a low state of health

folds on itself and passes upward and inward and over to the right side in a wide curve This may be due to the large diverticulum of the bladder

OPERATION

The patient was anesthetized and with the usual preparation, a suprapubic cystotomy was performed Upon retracting the cut edges of the bladder a very much thickened bladder mucosa came into view There was no evidence of pus The trabeculation and absence of lustre described in the cystoscopic findings were clearly evident. At one point to the left of the median line a large dimple in the mucous membrane was exposed Upon introducing a hemostat and spreading the jaws a large amount of pus gushed out. When the forceps was removed and the opening closed the pus could be sponged out of the bladder which was then apparently free from pus Upon introducing the forceps again more pus came out. This diverticulum was about 3½ inches long and about 1 inch in diameter It was held closed at its upper end and this accounted for the findings upon cystoscopic examination that manipulation of the bladder caused the medium to become foul with pus

Dr G J Thomas of Rochester in an article entitled Diverticulum of the Urinary Bladder published in Surgery Gynecology and Obstetrics Vol 33 No 4 October 1916 reviews the embryology and etiology of vesical diverticula and describes the methods for their cure The four routes of approach to the lesion with the intention of making a radical excision as quoted from Lerche in The Lancet 1912 vol 37 p 337 are

(*a*) The vaginal.
(*b*) The sacral
(*c*) Suprapubic intraperitoneal.
(*d*) Suprapubic extraperitoneal.

Thomas suggests various simpler methods as follows

(*a*) Incision through the vaginal wall and drainage
(*b*) Establishment of a fistula by sewing the diverticulum to the skin
(*c*) Peritoneal drainage behind the bladder

CLINIC OF DR CHARLES DAVISON

Cook County Hospital

TWO CASES: I. SUCCESSFUL REPAIR OF FRACTURED FEMORAL NECK. II. REMOVAL OF EXOSTOSIS FROM INTERNAL CONDYLE OF FEMUR

Summary Case I Fracture of neck of femur—technic of repair by bone transplantation preparation of operative field—dangers of antiseptic solutions choice of anesthetic the two incisions—anteriorly through which to maintain reduction laterally for introduction of transplant result as shown by present case

Case II Congenital and acquired exostosis of medial condyle of femur—how to differentiate treatment

FRACTURE OF NECK OF FEMUR BONE TRANSPLANT

THIS patient B A Norwegian clerk married aged thirty eight years, was injured by falling on an icy sidewalk on January 21, 1917

He was admitted to Cook County Hospital on the following day Examination showed loss of function of the entire left lower extremity There was external rotation of the leg with eversion of the foot Bryant's line was shortened The patient complained of acute pain in the hip on manipulation of the extremity A roentgenogram taken on the following day showed a clean cut fracture without impaction through the neck of the left femur (Fig 62)

Open operation and autoplastic repair by the transplantation of a segment of the fibula across the line of fracture was performed seven days after the injury according to the following technic

The field of operation was prepared by fractional sterilization The part was shaved scrubbed with green soap and hot water, washed with a solution of bichlorid of mercury rinsed with sterile water, and covered with sterile gauze At the end of twenty four

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duced A hypodermic injection of morphin and atropin precedes the anesthesia

In our work we use a modification of the Lane technic Many of the bone grafting cases are tedious and mechanically difficult Handling everything with forceps hinders and delays the operator materially For this reason the sponges are used with the hand The sponge is picked up in this manner (indicating) inserted into the wound removed, and cast aside without the gloved hand coming in contact with the wound The hand is not allowed in the wound except when protected by gauze which is immediately discarded Infection is no more likely to occur in a bone grafting operation than in any clean bone operation The technic of the operation consisted in open reduction of the fracture stabilization of the fragments by a segment of fibula and complete external immobilization of the hip joint by plaster of Paris

A perpendicular incision was made below the anterosuperior spine of the ilium exposing the fracture in the neck of the femur The detritus and loose fragments of bone were removed from the site of the injury The fragments were reduced An incision was made on the outer side of the thigh just below the greater trochanter With a hand instrument a canal for the placing of the transplant was made through the outer part of the femur below the greater trochanter through the neck and into the capital fragment

The direction of this canal was such that the transplant would enter at an angle to the shaft of the femur of about 135 degrees so that it would rest upon the base of the lesser trochanter and enter the capital fragment above the depression for the ligamentum teres The canal was made slightly smaller than the transplant

A segment of the lower part of the fibula of the same extremity 14 cm in length was removed without its periosteum for use as the peg transplant The canal through the cortical part of the femur was fitted to receive the transplant With the reduction maintained through the anterior incision over the fracture the transplant was driven into the canal pegging the fragments firmly together in reduction

hours this preparation was repeated At the time of operation we do not use bichlorid, iodin, or any other antiseptic, for the reason that any antiseptic material getting on the tran plant will kill the superficial bone-cells as surely as it will kill pyogenic germs The death of the superficial cells either of the tran plant or of the host prevents bone grafting and the operation results in failure

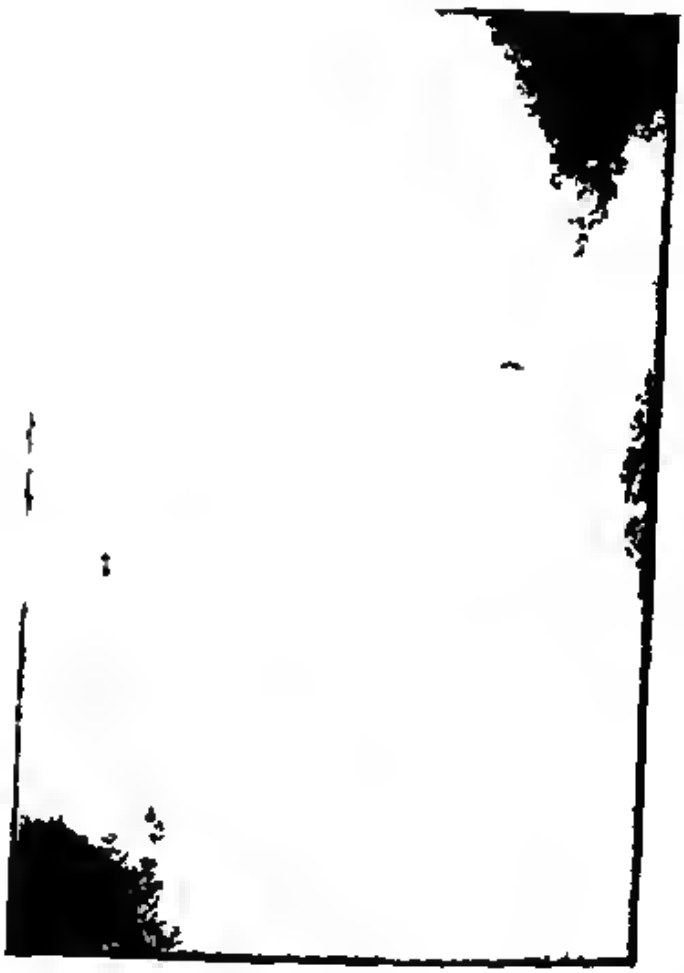

Fig. 67 Roentgenogram of fracture of the neck of the left femur

The anesthetic is important in these cases because of the length of time required to perform the operation and the shock which accompanies it In these severe bone operations the vitality of the patient must be conserved in every way We are using the combined gas ether oxygen method of anesthesia We find that by combining the warm mixture of these anesthetics in varying quantities according to the condition of the patient and the requirements of the operation a minimum of shock is pro-

knee on the opposite side, to prevent shifting of the back and thigh in the cast

Complete immobilization of the transplant to its host is essential to enable the transplant to graft into its new position

After eight weeks the cast was cut away to relieve the knee joint, and after three weeks more the cast was entirely removed and the patient allowed to be about on crutches

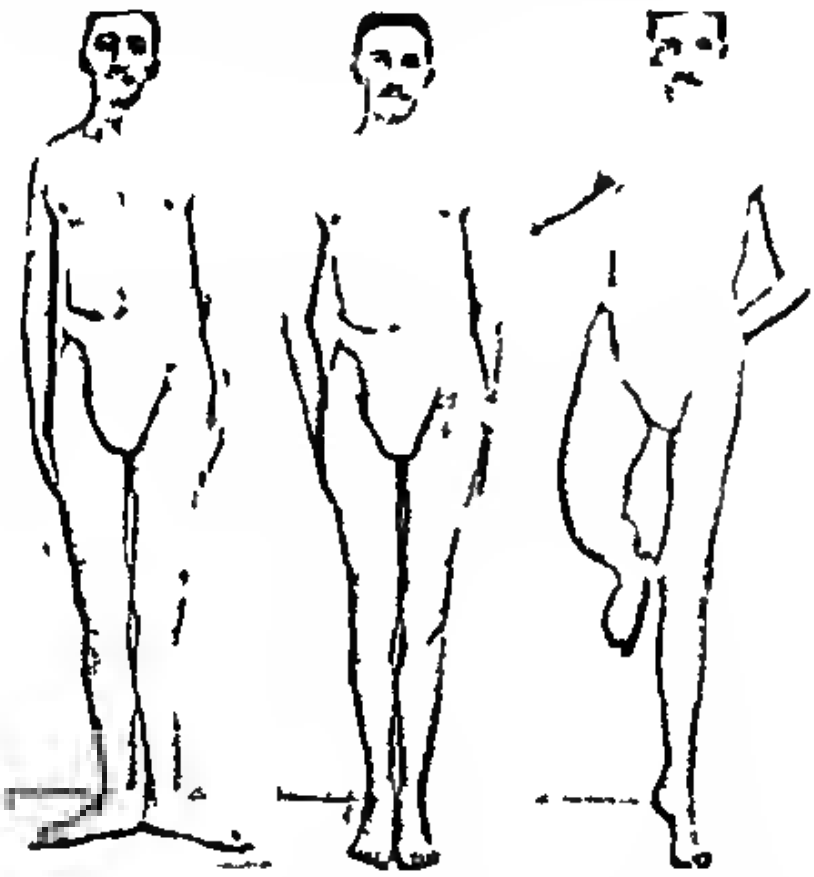

Fig 64 Fig 65 Fig 66

Fig 64.—Standing erect with both feet on the floor showing extreme external rotation of the thigh

Fig 65.—Standing erect with both feet together on the floor in normal voluntary position of rotation of the injured (left) extremity

Fig 66.—Standing with full weight on the toes of the injured (left) extremity

You can see the scar locating the anterior incision through which the capital fragment was controlled during reduction You can see the location of the lateral incision through which the transplant was inserted The *x* ray taken yesterday shows the position of the transplant bony union of the fracture and the presence of the bony callus (Fig 63) Notice the angle of the

The thigh was placed in external rotation to relax the muscles attached to the greater trochanter and slightly flexed to relax the iliopsoas muscles The extremity was placed in extreme abduction to prevent a muscular cross-strain at the fracture

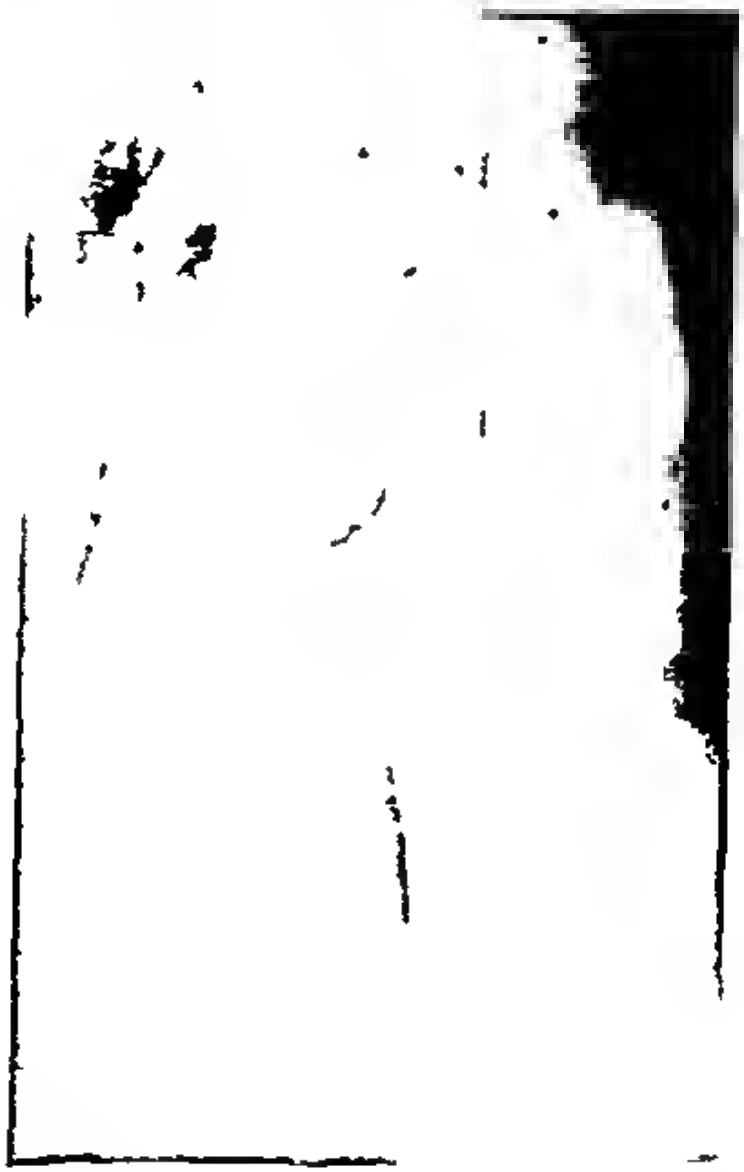

Fig 63 —Roentgenogram of autoplastic repair of fracture of the neck of the femur three month after operation showing the peg transplant grafted across the line of fracture with bon union of the fracture

After a final examination of the reduction the wound was closed and external immobilization applied The plaster cast extended from the axilla to the toes on the injured side and to the

attached to the internal condyle of the right femur He tells us that the mass has been there as long as he can remember but never gave him any trouble until one year ago It has lately been increasing in size There has been a constant dull aching pain during the past year He entered the hospital to have it removed

Fig 69—Roentgenogram of exostosis of right femur

The roentgenogram (Fig 69) shows a bony mushroom shaped growth attached to the internal condyle of the femur and extending in the direction of the tendon of the adductor magnus

transplant I tried to place it at a greater angle to the shaft of the femur than the normal angle with the neck so that the contraction of the muscles would force the capital fragment against the transplant without producing a cross-breaking strain upon the transplant

This man can walk on the injured extremity (Fig 64) He can stand erect with his heels and toes together in normal rotation (Fig 65) He can stand on his toes (Fig 66) He can abduct his thigh (Fig 67) He can flex his thigh (Fig 68)

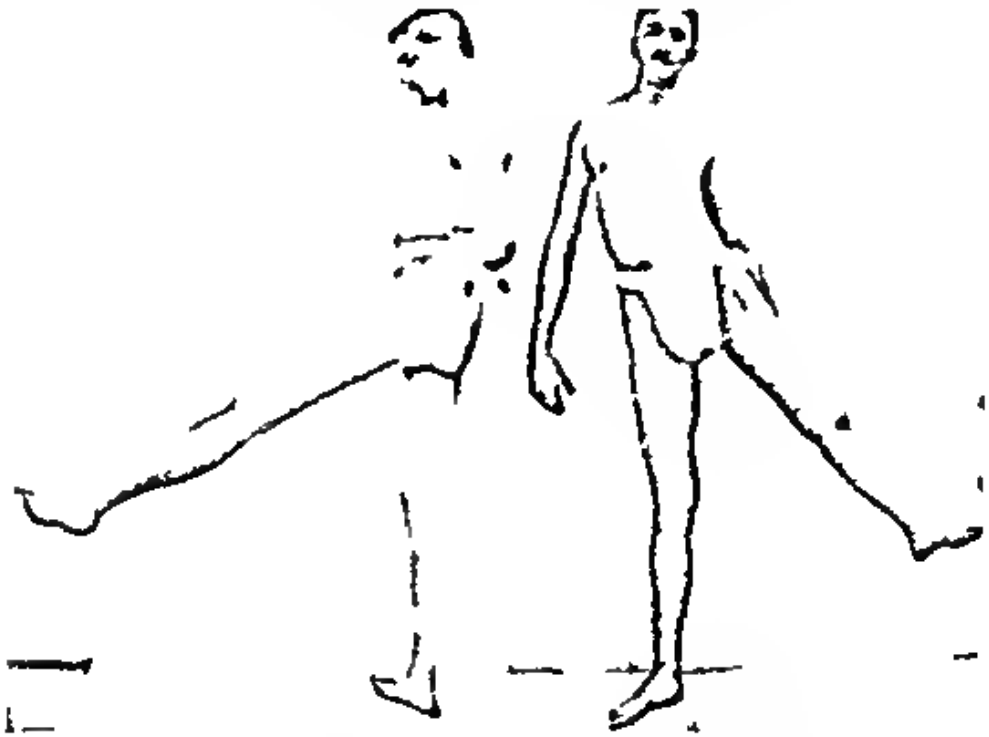

Fig 67 Fig 68.

Fig 67 —Degree of voluntary abduction at the hip-joint.
Fig 68 Degree of voluntary flexion at the hip-joint.

Because of the danger of falling and refracturing the hip I am endeavoring to keep him from walking without crutches until by exercise and massage the muscles and joints are restored to their normal activity and functional ability

EXOSTOSIS OF THE FEMUR

This patient M D Irish laborer single aged twenty seven was admitted to the hospital complaining of pain in a hard mass

CLINIC OF DR CHARLES A PARKER

Home for Destitute Crippled Children

A NON-OPERATIVE CLINIC ILLUSTRATING THERAPEUTIC MEASURES EMPLOYED IN A VARIETY OF ORTHOPEDIC CONDITIONS

Summary Cerebral spastic paralysis—Little's disease Method of handling prognosis depends upon mentality

Four cases of infantile paralysis one recent and three older Examination

Three cases of knee joint tuberculosis, two in children and one in an adult the former in good position in casts the latter suffering from improper

Tuberculosis of os calcis now entirely cured after two years of cast treatment without operation.

Congenital club-foot operated upon several weeks ago Still wearing cast which is frequently necessary for many months after correction to prevent relapse

Acute suppurative destruction of the upper femoral epiphysis—so-called epiphysitis This case was more fully reported in the August Clinics

Leg ulcer in adult Adhesive plaster strapping and proper support almost a panacea Patient allowed to continue work during treatment

Scoliosis Preparation of corrective jacket

There is no operative work today but I think you will be interested in the variety of orthopedic work that comes into our out patient department

CASE I—CEREBRAL SPASTIC PARALYSIS

This boy is now twelve years old and walks in with the aid of two crutches The brief history is that the birth was a difficult forceps delivery As a child he was backward and weak When

This bony growth may be congenital or it may be acquired. *If it is congenital, the tendon of the* muscle may be attached to its upper expanded surface If it is acquired, the tendon of the muscle may be stretched over its anterior surface It may be the result of an ossifying process in the tendon of the adductor magnus

In the operation the attachment of the tendon of this muscle must be conserved

Operation.—I will make a longitudinal incision over the exostosis cutting through the skin fat, and deep fascia, exposing the muscle The muscle and its tendon are stretched tightly across the mushroom like mass but not attached I push aside the tendon and expose the exostosis, which is *free from the* surrounding soft tissues but attached to the internal condyle of the femur

I am careful to avoid opening the knee joint I remove the exostosis with a sharp chisel and close the wound in the usual manner

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Four cases of infantile paralysis one recent and three older Examination differentiation from the spastic type method of treatment varying in different cases—long-continued rest in bed with supporting apparatus for acute cases corrections apparatus and muscle training for the older

Three cases of knee joint tuberculosis two in children and one in an adult the former in good position in casts the latter suffering from improper operative interference now in a cast with the knee not yet in good position—that of complete extension Necessity of keeping patient off of feet during treatment while knee is bent or still painful

Tuberculosis of os calcis now entirely cured after two years of cast treatment without operation

Congenital club-foot operated upon several weeks ago Still wearing cast, which is frequently necessary for many months after correction to prevent relapse

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CASE I—CEREBRAL SPASTIC PARALYSIS

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five years old the shortened tendo achillis was cut in either leg after which he was able to walk A year and a half ago he first came to us with knees flexed 40 degrees and adductors tense, allowing a separation of the knees of only 10 inches. There was spasticity present and he walked with bent knees and a shuffling gait.

December 6, 1917, under ether anesthesia, a subcutaneous myotomy of the adductors in both thighs was performed, and the inner and outer hamstrings of both knees were tenotomized The legs were then straightened and widely abducted and put up in plaster-of Paris from the navel to the tips of the toes Two months later these were removed and removable casts were made to hold the knees straight, and the child was sent home, since which time he has occasionally returned to the clinic for observation This is, as you know, primarily a cerebral condition.

Present condition Although he uses his crutches for safety, he does walk some without them He removes his casts at night and the legs remain straight until he reapplies them in the morning His mentality has greatly improved He is in the fourth grade of the Spalding School for cripples and is inclined to be quite jovial in his conversation The legs can be widely abducted with very little restraint. The reflexes are greatly increased in this condition thus differentiating it from the flaccidity of infantile paralysis, to be seen later With his limbs in proper position he now needs much help in muscle training to regain as nearly as possible normal muscle balance, which is so seriously disturbed in this condition The prognosis as regards physical development depends greatly upon the mental improvement. The best physical apparatus in the world is of little use to an idiot but a good mind will do wonders with a poor physical legacy

CASE II.—RECENT INFANTILE PARALYSIS

This boy is thirteen years old I saw him recently at the County Hospital, where he had been taken four weeks previously suffering from an acute attack of infantile paralysis affecting one leg and the trunk At present he cannot flex his trunk sufficiently to raise his body from the table as he lies on his back.

The anterior group of muscles of the right leg is weak He has been wearing a removable cast extending from the toes to the perineum with the leg straight and feet at right angles This was applied at the County Hospital recently, but has been left at home today, as the father thought it too heavy while carrying the child He will be advised to continue the use of the cast for several months, with no attempts at walking or even sitting up right, as with such an extensive paralysis of the abdominal muscles scoliosis is very likely to develop if the upright position is assumed early and the trunk muscles remain weak or paralyzed He should be brought to the clinic at least once a month for examination and advice

CASE III.—OLD CASE OF INFANTILE PARALYSIS

This girl is now nineteen years old She had an attack of infantile paralysis when three years old She wore braces from the time she was six years old until she was nine, when they were discarded as being useless When she first came to us a year ago she was able to get around on crutches, landing each time on her left leg which was overextended at the knee, but not able to stand on the right, which lacked 10 to 15 degrees of complete extension She was unable voluntarily to extend either leg at the knee, and the right foot, though possessing no active function, was easily put in good position

There was a recurring dislocation of the left shoulder joint from paralysis of shoulder muscles The muscles of the left hand were also defective, especially the opponens pollicis In addition there was a long sweeping curvature of the spine to the left with marked rotation occupying the middorsal and lumbar regions, so that in the sitting posture the back was shortened several inches by its curved and relaxed condition

At that time a cast was put on the right leg with the knee forcibly held in extension, and this was worn with changes nearly six months Last December a plaster-of Paris corset was applied with the patient lying on her back on a narrow strip of canvas in an Abbott frame This corset or pattern was immediately removed by cutting it down the middle in front when it was sealed

in front and across the bottom, and cast full of plaster-of Paris, thus giving us her plaster torso to work upon in the production of the ultimate corset The torso was corrected by shaving off the more prominent deformities with a draw knife and adding more plaster to fill up the hollows till the completed torso approached closely that of the normal figure Over this the final corset of plaster-of Paris was made It is the one that is now placed upon her and buckled with four straps across the front, giving her a form that any young lady might be proud of

At present the right leg is straight at the knee, while in the left there is still some recurvation In neither is there active power of knee extension, and the patellar reflexes are lost, thus differentiating it from the spastic type just shown, in which they were greatly increased A tracing of both legs and feet is made to be sent to the instrument maker for a pair of braces, the one on the left leg to prevent recurvation and the one on the right to prevent involuntary flexion.

With the braces and corset she will be able to stand firmly erect and need the support of her crutches only in swinging from one standing position to another Braces will now be entirely effective and easily hold the limbs since they have been placed in the proper positions. It is a fundamental rule that the *ambulatory braces should not be applied until the limbs are placed in the proper position with the knees extended and feet at right angles to the legs* Lack of attention to this particular is responsible for much disappointment in the use of braces

CASE IV.—INFANTILE PARALYSIS

This patient is two years old and began to walk on the outer side of his foot when eighteen months old I first saw him several months ago at the Cook County Hospital. His foot was then in varus, with a weakness of the peronei muscles It was corrected manually without an anesthetic and put in plaster Several casts have since been applied The foot now retains its position much better when the cast is off but it is not yet safe Perhaps the peronei may recover their function if their opponents are properly restrained for a sufficient length of time He is too

young for satisfactory muscle training, and the restraint of the stronger muscles is the most important thing at present

CASE V.—INFANTILE PARALYSIS

This child is now nine years old She had an attack of infantile paralysis when three years old, and she has been under our care more or less constantly ever since The trouble has been limited in its effects to the feet, which have never been very bad, but always with a tendency to equinovarus The girl is now wearing a cast on her right foot, which was applied several weeks ago for the correction of slight equinus This cast will be removed and another applied, with the knee held flexed and the foot overcorrected in dorsal flexion The left foot was recently corrected in a similar manner The general shape and function of these feet are now not far from normal, and really better than many feet that have been distorted by improper shoes

This non-operative clinic illustrates many of the slower measures used by the orthopedic surgeon to obtain worthwhile results in a class of cases that the general surgeon usually has neither time nor inclination to treat

CASE VI.—TUBERCULOUS KNEE

This child is four years old The trouble in the right knee was first noticed last April, when she complained of pain at night She came to us a month ago with the right knee slightly flexed and painful She had worn a cast for a month and a half, but for some reason had been without a cast for a month when she came here It has now been in a cast for a month and a new one will be applied today

Another inviolable orthopedic rule is *Never remove a cast from an inflamed joint until you are ready to immediately apply another* The neglect of this rule is responsible for much misery in joint surgery

CASE VII.—TUBERCULOUS KNEE AND SPINE

This girl is eleven years old and appears well developed and in good health She is wearing a cast on the left leg for tuber

culosis of the knee-joint. About four years ago this patient had tuberculosis of the fifth lumbar vertebra, where there is now a distinct rounded eminence with no evidence of present disease.

The trouble commenced in the knee about a year ago She came on to my service in the County Hospital about six months ago, and a cast was applied This has been changed from time to time and the patient has worn a high shoe on the other foot and walked with crutches not bearing her weight on the affected knee When the cast is removed the knee appears only slightly swollen and moderately tender, with a limited amount of flexion. A new cast is applied with the knee straight. *Probably in a* month she will be allowed to walk on that leg if the knee continues as well as at present.

CASE VIII.—TUBERCULOSIS OF KNEE-JOINT

This man is forty four years old and has been suffering from tuberculosis of the right knee for two years. He came on our service one month ago. He is now wearing a plaster cast extending from slightly above the malleoli to the perineum, with the knee in a position of 20 degrees of flexion There is a fenestrum opposite the knee-joint, beneath which is a small discharging sinus. He has been wearing casts for about a month during which time the knee has been straightened from a position of about 40 degrees flexion to the present position When first examined there were several scars about the knee the result of four draining operations he has undergone in the last two years, with the very natural result of continued increase in trouble. These operations were not performed by an orthopedic surgeon. Following none of them was there a persistent attempt to protect or extend the joint, and he was allowed to walk upon it—a complete sermon of neglect. Now he wears his cast and goes on crutches. His pain has practically vanished. The cast will be changed once a month until the leg is straight. when if the pain and symptoms remain quiescent, he may again be allowed to step on the foot of the affected leg

Another orthopedic rule applies here *Do not allow the patient*

with a flexed and inflamed knee to step upon the foot of the injured limb even if the knee is in a cast For no matter how well the cast is applied, some grinding movement takes place in the flexed joint when standing upon it When the knee becomes straight then walking upon the member may be resumed if no pain is present

CASE IX—TUBERCULOSIS OF OS CALCIS

This child is eight years old She first came under my observation at the Cook County Hospital about two years ago suffering from tuberculosis of the left os calcis At that time there was slight pain, some swelling about the ankle, and a discharging sinus on the os calcis The foot and leg to the knee were put in a plaster cast with a fenestrum to dress the sinus, and the child kept in bed several months to keep her from walking on the foot Later she was given crutches and a high shoe advised for the sound foot, so the affected one would swing clear in walking and then sent home

She has returned from time to time for observation and treatment by casts eventually walking on the foot while wearing a cast She has now worn no cast for the last three months and there is no evidence of present disease There are two scars of the former sinuses and all movements are normal and painless She will return for observation once a month As the child had suffered several years before coming under my care the complete cure has probably taken three or four years the usual length of time for these conditions where permanency of cure is demanded

CASE X—CONGENITAL CLUB FOOT

This little girl is now two years old August 1st she was operated upon for congenital equinovarus of the left foot She is wearing a cast and the foot appears to be in good position It will now be removed, and although the position is good another will be applied with the foot dorsal flexed to less than a right angle and in marked valgus She will continue to walk in this cast for a month, when it will be removed, and if correction is considered

complete and safe, further treatment may not be necessary, though it should be kept under frequent surveillance for a long time. This is a comparatively simple case. In more stubborn cases casts or braces may have to be worn for a year and even longer after complete correction to prevent relapse.

CASE XL—ACUTE SUPPURATIVE DESTRUCTION OF THE UPPER FEMORAL EPIPHYSIS, SO-CALLED EPIPHYSITIS

This child is something over two years old. He came to us in February suffering from pain in the right hip, which at that time was swollen and flexed 45 degrees, with a history of an inflammatory affection of the joint antedating that period several months. An *x*-ray showed a loss of the upper femoral epiphysis with an upward displacement of the neck. (Reported in the SURGICAL CLINICS OF CHICAGO, August, 1917.) An abscess developed later and the joint was drained His general condition now is good. He is now wearing a plaster-of-Paris hip spica with lateral fenestrum for the discharging sinus The cast is soiled and broken and will immediately be replaced with a stronger one. The cast is used to enhance healing and to prevent the development of a flexion deformity.

CASE XLI—LEG ULCER

This is a woman, forty-six years old, with two typical ulcers of the leg, now much reduced in size, but still measuring from 1 to 2 cm. in diameter, accompanied by very firm regional edema and moderate eczema

Adhesive plaster strips 2 inches wide and long enough to encircle the leg are applied over the ulcers and drawn tightly around the leg Zinc salve is then used on the eczema and a tight muslin roller applied The patient comes once a week, when the adhesive plaster is removed and fresh strips applied. She remains active upon her feet The ulcer is reducing satisfactorily, the eczema is diminishing, and the leg is becoming much smaller in the edematous region. This is a well-tried and very satisfactory treatment for leg ulcers.

CASE XIII—SCOLIOSIS

This girl is fifteen years old and is wearing a plaster of Paris corset that was made for her over a corrected torso about ten months ago It is still in fair condition, but a new one is desired She will return next week to have a pattern made for a new torso in the manner described in Case III although the pattern in this case is made with the patient standing as she has no paralysis

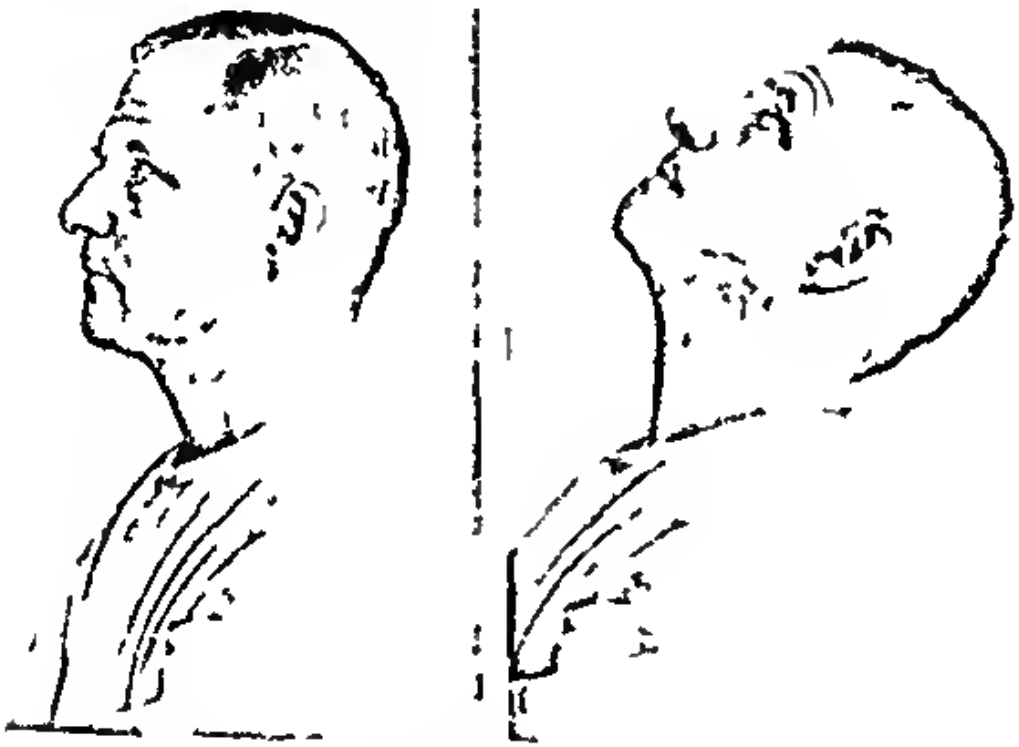

Fig 70 Fig 71

Figs 70 and 71 —Two photographs illustrating the result in a case of extensive burn of the neck treated by adhesive plaster strips in an apparatus to prevent contractures Original condition and method of treatment shown in June CLINICS

(This patient was admitted to the County Hospital on the 9th of February 1917 with a complete collar burn of the neck extending upon and destroying the skin of both ears in addition to that of the whole anterior and lateral region of the neck The various stages in the treatment by means of adhesive plaster strips and plaster-of Paris collar and cape are well shown in the June CLINICS The burn was

prevented)

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Fig

Fig 71

Fig l l lot g a hs lu a n he r sult in a ca e of exten e t u n h k d l a he e pl a t s rips nd an ap pa a u to p e nt cont n l n n nd me hod of t eatment shown n June CLINICS (Th n a m d th C un y H p al on the oth of F bruary 0 h a m ar bu n of he ne k x nd ng upon and destroy ng the sk n fl n l n h i f be hole anter or and late al c h ons of the ne k F n l e atment by means of adhes e plaster str p and pl l a n l ap a e c l shown n Je June CLINICS The burn was of h a l h e th oughout th s reg on and has no healed ent ely aft d l month of a l e tr atment with the result ho n n the t n p ne g ng he profi e of tl e ch n F e o lo ng h l u l pl ab m p n l u d be

CLINIC OF DR JOHN RIDLON

Mercy Hospital

DIFFICULTIES IN THE DIAGNOSIS OF HIP DISEASE—A CASE OF OSTEO ARTHRITIS

Summary A patient with a history of recurrent attacks of pain and loss of function in the right hip for seventeen years tuberculosis osteo arthritis and hysteria to be considered diagnosis made on the x ray findings

The following case is unusual and interesting

An unmarried woman thirty four years old with a good family history When about twelve years old was run over by a light wagon She soon recovered and remained well for five years Then when seventeen years old on turning over in a sleeping berth something happened at the right hip and she was unable to walk From this she fully recovered and soon Five years later she developed spells of being lame in the right leg and she also had pain in the right knee She would drag the leg when walking for a day or two and then be better In 1906 she became so lame that she took baths for rheumatism "

In 1907 she went lame in May and in July was put to bed where she remained for six months Had extension on the limb from September to Christmas After that she wore a brace during the daytime and had weight and pulley extension at night She used crutches for five years after the brace was removed

During 1913 she had extension for three months and a plaster cast for twenty three weeks Then she considered herself practically well but has used a cane and the pain has been less But she had a fall and the hip became so bad that she could not walk Again had extension She had a temperature and an abscess was feared Again last year she had weight extension for a while and a plaster cast for nine months up to last May

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Now "the limb is sore all the time," and there is pain The pain does not waken her from sleep, and goes away when she rests the limb She has some indigestion, but is not constipated Has never had tonsilitis Has tooth crowns and one bad tooth that "ulcerates" and aches when the hip aches Never has had any great amount of leukorrhea Looks well and is well covered with fat.

Fig 12—Diseased hip Note changes in head and neck of femur and in the acetabulum as described in text

Right leg is $\frac{3}{4}$ inch short calf same size as left but upper part of thigh is $1\frac{1}{2}$ inches smaller There is no certain motion (passive) at the hip-joint but he flinches at the least attempt at moving the limb although she walks about the room without the cane and with no facial evidence of sensitiveness or suffering There is no deformity at the hip

The history of periodic attacks covering several years, the

pain at the knee, the temperature and "abscess feared," strongly suggest a tuberculous hip But the lack of atrophy of the calf, and particularly the absence of flexion and adduction deformity of hip warrant a doubt as to that diagnosis

The bad (ulcerating) tooth suggests osteo arthritis, but the long continued periodicity of the symptoms and the lack of adduction deformity give reason for doubt

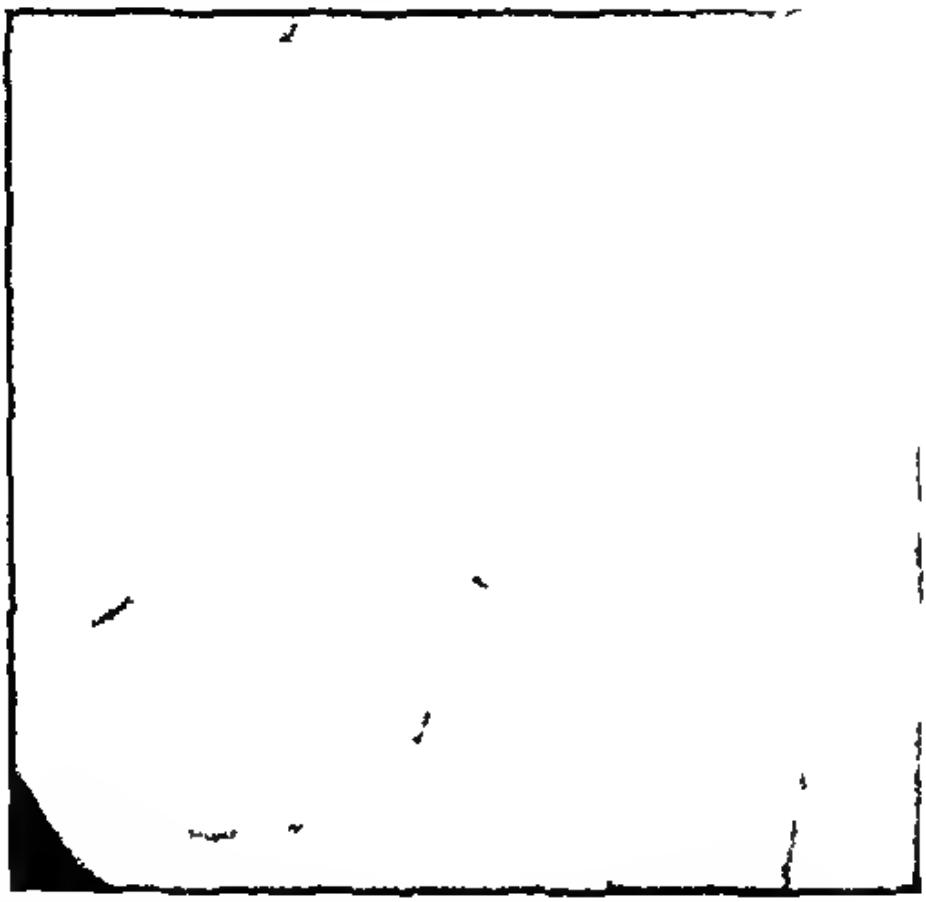

Fig 73 —Radiogram of normal hip for comparison with Fig 72

The extreme sensitiveness to gentle attempts at passive motion when on the examining table taken with the apparent lack of sensitiveness when walking around suggest a hysteric hip particularly in an unmarried woman thirty four years old But there should be no atrophy of the thigh with a hysteric hip

The radiogram (Fig 72) shows $\frac{1}{2}$ inch erosion into the upper border of the acetabulum and at least two-thirds of the caput femoris destroyed Deposits are seen along the upper border of the neck at least $\frac{1}{16}$ inch thick and a similar deposit extending

out from the border of the acetabulum, as if the capsule had been thickened and then calcined (Compare with Fig 73, the normal hip) Doubtless a similar deposit is at both the front and back of the femoral neck, since some deposit shows below the neck Radiograms of the teeth show three that must be removed and many requiring treatment

From the *x* ray findings we are warranted in the diagnosis of an osteo-arthritic hip